

**Annual Report of the
DEPARTMENT OF AGRICULTURE**

For the year ended 31st December, 1961



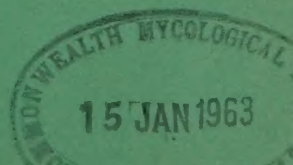
UGANDA PROTECTORATE

**Annual Report
of the
Department of Agriculture**

For the Year Ended 31st December, 1961

Published by Command of His Excellency the Governor

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UGANDA PROTECTORATE

DEPARTMENT OF AGRICULTURE

Annual Report

For the year ended 31st December, 1961

I. INTRODUCTION

(a) Policy

THERE has been no change in the basic policy of the Department which remains as follows:—

- (i) To ensure the food supplies of the people of the country.
- (ii) To conserve the natural resources.
- (iii) To improve the quality and increase the quantity of our cash crops.
- (iv) To blend the whole into a sound system of agriculture.

2. Uganda is blessed with fertile soils and normally a well distributed rainfall which makes farming a reasonably secure occupation. There is an abundance of good cultivable land and the real problem facing the territory is how to break through the level of subsistence agriculture.

3. The short answer is that the farmers are hopelessly under-capitalised and the bulk of the work has still to be done with the hoe. Production is not keeping abreast with development which makes Uganda a poor country economically. It is not always appreciated that all the increase in production in the post-war period can be accounted for by the natural increase in the population and that the increase in Robusta coffee production was at the expense of the cotton crop in Buganda.

4. Last year the emphasis was on concentration of effort to give the maximum assistance to the Progressive or Emergent Farmer in order to develop a class of Yeoman Farmer which will form the backbone of sound agricultural development—in other words, every good farmer must “be given the tools with which to do the job”.

5. Nineteen sixty-one saw two major advances in this drive to raise the general standard of farming above the subsistence level. These were the promulgation of the Progressive Farmers Loans Scheme and the Agricultural Subsidy Scheme. These two schemes, which are complementary have made it possible for every progressive farmer to obtain the essential equipment he needs to farm his land properly. The plough must replace the hoe and row cropping must replace the more haphazard broadcasting so that farmers can plan and use their labour more rationally. The major difficulty has been to design a seeder or planter which will sow the wide range of crops which an African farmer requires

to grow and that this has been done is very largely due to the initiative and drive of the Special Development Section of the Department. The way is now wide open to break through from subsistence agriculture to farming in its true sense.

6. In October the International Bank for Reconstruction and Development published its plan for the economic development of Uganda. The plan has, as its basis the development of agriculture and forms a blueprint which if adopted wholeheartedly by Government could result in an agricultural revolution.

(b) General Review

7. The outstanding feature of the year from the agricultural viewpoint was the abnormally heavy second rains and their disastrous effect on the 1961/62 cotton crop which earlier in the year had promised to be a record one.

8. The drive to increase agricultural production was maintained and special emphasis was again placed on the improvement of the quality of all export crops in view of the highly competitive state of overseas markets.

9. Local food shortages were caused by the influx of refugees into Ankole and Kigezi districts and food was short in a few areas in the Eastern Province in April and May. Otherwise, supplies were adequate throughout the year despite the ravages of "army-worm" *Laphygma* spp. on the main finger millet crop in the Eastern and Northern Provinces.

10. The 1960/61 cotton crop amounted to 371,022 bales and the whole crop (lint and seed) realised nearly £16½ million at the Kampala auctions. Planting of the 1961/62 crop made excellent progress and a record acreage was established under favourable conditions. In August the crop was extremely promising and an output of 500,000 bales seemed possible; this hope was however dashed by the abnormal weather which followed and at the end of December the crop forecast stood at 200,000 bales—the smallest crop since 1947/48.

11. The Robusta coffee crop was the smallest since 1958, but at the end of the year the 1961/62 Bugisu Arabica crop promised to be a record. The total value of all coffee exports during the year amounted to a little over £14 million. The upward trend in sugar and tea production was maintained and both crops were records for the fifth year in succession. Provision was made for African farmers to participate in the tea industry as outgrowers, whilst the acreage of sugar planted by outgrowers on the two main sugar estates rose to nearly 4,000 during the year.

12. Dark-fired tobacco production was disappointing, being one-and-a-half million pounds below local manufacturing requirements. Flue-cured leaf production was however above the target due to a very good crop in the West Nile District.

13. Increased attention continued to be paid to the production and marketing of minor crops, including groundnuts and spices. The buying season was again gazetted for groundnuts in the Eastern Province and total purchases were estimated at 18,000 tons, of which 10,000 tons were exported.

14. Farmers participated to an increased extent in the processing of their crops and the number of estate coffee factories operated by growers' co-operatives and associations of growers rose to 32 and the percentage of the total crop

of African-grown coffee, other than Bugisu Arabica, handled by these organisations rose from 29 per cent in 1960 to 40 per cent in 1961. In Acholi District where the use of miniature tobacco curing barns is most advanced, nearly 44 per cent of the flue-cured crop was cured by the farmers themselves.

15. The two main farm institutes at Bukalasa and Arapai had a successful year, although both institutions could have taken considerably more students had suitably qualified men offered themselves. A diploma course was started at Bukalasa during the year and for the first time the certificate course was made available to women students. Forty-eight students successfully completed their training at certificate level at the two institutes and new entries, all of whom were in possession of the Cambridge School Certificate, totalled 65. The number of district farm institutes increased to five and over 900 farmers and their wives took advantage of the short courses offered.

16. Interest in farm planning was well maintained and the initial response to the Agricultural Subsidy and Progressive Farmers' Loans Schemes was very encouraging. The major effort of the extension services was directed at progressive and emergent farmers as the spearhead of agricultural development. Agricultural competitions were organised in all provinces and proved effective in focusing attention on the need for the proper protection of both arable and grazing lands and in encouraging the adoption of improved agronomic practice by farmers.

II. WEATHER

17. Nineteen sixty-one was an extremely difficult year for farmers owing to the excessively heavy second rains which not only adversely affected the growth of crops, but seriously interfered with the marketing of agricultural produce due to flooded roads and broken bridges. Further, the weather pattern early in the year proved especially favourable for the development of army-worm *Laphygma* spp. which caused damage to the main millet crop.

18. The dry season was more severe than usual in most areas in January and February, but during March there was a general increase in rainfall intensity and the main rains finally broke in the third week of the month. Except in parts of the Eastern and Northern Provinces there was sufficient rain throughout April. The unsettled weather continued until the end of May in the Western Province, but in other provinces mainly localised rain was received after the middle of the month. June was fairly dry everywhere, apart from the Eastern and Northern Provinces, where heavy rain was recorded during the third week. During July there was heavy and persistent rain throughout the Protectorate, with the exception of the extreme south. The following four months were exceedingly wet and overcast and in parts falls were the heaviest in living memory. Although rainfall was generally lighter in December, the unsettled weather persisted until the end of the year, especially in the southern half of the country.

III. FOOD CROPS AND FOOD SUPPLIES

19. The influx of refugees from Ruanda-Urundi caused local shortages in Ankole and Kigezi districts, whilst food was in short supply in the Bugisu plains in the Eastern Province during April and May, with these exceptions food was

adequate throughout the year. There was an unusually severe and persistent outbreak of army-worm, which caused extensive damage to the main finger millet crop in the Eastern and Northern Provinces and despite repeated re-sowing the harvest was a poor one, except on the heavier soils of Busoga District. The abundant rain in the second half of the year enabled large acreages of cassava and sweet potatoes to be established and this coupled with the good sorghum harvest in the main grain-eating areas secured the food position. Plantain crops in the Eastern Province suffered from the severe dry season, but generally supplies were satisfactorily maintained although the prolonged cold weather caused local shortages late in the year. In Buganda transport of plantains to urban areas was severely restricted owing to the state of the roads in the last quarter of the year.

20. At the close of the year the carry-over of finger millet was much less than in 1960, but provided the spring rains break at the normal time, no serious shortages are expected before the 1962 harvests are gathered.

IV. ECONOMIC CROPS

(a) Cotton

(i) 1960/61 Season

21. As the crop year is from 1st May to 30th April this report deals only with the marketing of the 1960/61 crop.

TABLE A.—COTTON PRODUCTION
1949/50–1961/62

Season	Estimated acreage	Bales of lint (400 lb.)	Average yield of seed cotton per acre	Average price to growers for 100 lb. seed cotton
			<i>lb.</i>	<i>Shs. cts.</i>
1949/50 ..	1,628,473	339,788	282	31 75
1950/51 ..	1,535,200	346,465	301	43 16
1951/52 ..	1,514,157	380,304	332	47 56
1952/53 ..	1,472,553	319,992	290	48 60
1953/54 ..	1,611,223	397,594	325	49 40
1954/55 ..	1,738,821	299,831	227	58 81
1955/56 ..	1,585,500	363,449	305	52 11
1956/57 ..	1,568,539	372,185	313	53 34
1957/58 ..	1,617,013	350,693	288	54 90
1958/59 ..	2,014,020	400,682	263	44 20
1959/60 ..	1,564,744	360,260	300	44 81
1960/61 ..	1,516,155	371,022	318	52 23
1961/62 ..	2,072,121			

22. Picking and marketing proceeded rapidly in all zones during January and February, but wet weather during March delayed the work, particularly in the Toro Zone where the crop is grown during the second rains. Grade was satisfactory and showed an improvement on the previous season. The total crop was 371,022 bales, which was 10,750 above that produced in 1959/60. Table A gives the comparative figures for production in the last 12 seasons.

23. Prices to the grower for clean raw cotton were 55 and 54 cents per lb. for BP.52 and S.47 growths respectively. Stained raw cotton was priced at 20 cents in all zones, except West Nile where the price was 23 cents per lb. It is estimated

that the total return to growers from the sale of their crop was £12,574,623. The crop (lint and seed) realised £16,491,558 on the Kampala auctions.

24. The number of ginneries working was 129, of which 14, three in Buganda, eight in Eastern Province, one in Western Province and two in the Northern Province, were operated by African Growers' Co-operative Unions. All lint cotton was purchased from ginneries by the Lint Marketing Board at prices based on the statutory fixed prices to the grower, and the whole crop was sold on the Kampala auctions together with all seed not required for planting.

(ii) 1961/62 Season

25. The 1961/62 season was a disastrous one for cotton farmers, which was particularly disappointing in view of the large acreage planted. Good progress was made with planting in May, chiefly in Buganda and the Eastern Province and there was sufficient rain in June for sowing to continue throughout the month in most areas. The unusually wet weather in July and August enabled large acreages to be established under favourable conditions. The final acreage was 2,072,121 compared with 1,516,155 in the previous season. During August however, there were signs that the prolonged cold wet weather had begun to affect the growth of the earlier plantings adversely, and *Lygus* attack was severe in the Eastern and Northern Provinces and the north of Buganda. With the continuance of abnormally heavy rain during November and most of December, boll-rots and boll-worms took a heavy toll of the crop and a total production of only 200,000 bales was forecast.

(iii) Multiplication of new Strains of Cotton

26. In both the BP52 and S47 areas the seed multiplication scheme whereby successive annual waves of pedigree seed are issued in each zone, continued, and no part of either area planted its own seed. Seed of each variety was issued in the same zones as in 1960.

(iv) Cotton Seed Dressing

27. All seed used for planting, amounting to over 24,000 tons, was again treated against bacterial blight. With a view to reducing the cost of dressing a prototype automatic seed feeder was constructed and if successful in the trials to be conducted in early 1962, will be brought into use in all seed dressing stations.

(v) Cotton Spraying

28. Spraying against spiny boll-worm and *Lygus* continued and approximately 16,000 acres were protected compared with 5,000 acres in 1960. Despite the adverse weather conditions and low overall yields the economic advantage of spraying early planted cotton was again well demonstrated. At Wera in Amuria County of Teso District a plot which was planted in April and sprayed gave a yield of 866 lb. of *safi* cotton and a similar plot of 4 acres at Amuria Prison Farm gave an average yield of 640 lb. of *safi* per acre. These yields compare with an average yield of only 46 lb. of seed cotton in the Teso Zones. It is significant that in Usuku where the cotton is early planted the mean yield was 107 lb. of seed cotton per acre compared with 33 lb. in north Teso and 46 lb. in south Teso. The most progress was made in Lango District where over 8,000 acres were sprayed.

(b) Coffee

(i) *Bugisu Arabica 1960/61 Season*

29. The total production was 5,149 tons of parchment and 315 tons of "buni". The whole crop was processed by growers themselves using hand pulpers, apart from 33 tons produced by two central pulperies.

30. The average price paid to growers was Shs.1/65 per lb. of parchment, compared with Shs. 1/64 in 1959/60. The whole crop was milled in Mbale and auctioned in Nairobi, the average price realised being £286 per ton compared with £316 in 1959/60 and £326 in 1958/59.

(ii) *Bugisu Arabica 1961/62*

31. The season started well with a heavy flowering at all altitudes and a good crop was set. A special drive to encourage improved husbandry including pruning met with varying response from farmers. Some progressive farmers set up water storage tanks to supply water to their pulpers and made an all-out attempt to produce better quality parchment. Unfortunately these people remain very much in the minority. In pursuance of the policy to raise quality the following new grades of parchment were introduced during the season:—

(a) *Pulpery Grade*—Clean, dry coffee of good appearance containing no blacks or pales and not more than 2 per cent defective beans.

(b) *No. 1 Grade*—Clean, dry coffee of good appearance containing no blacks or pales and not more than 7 per cent defectives.

(c) *F.A.Q.*—All other coffee, clean and dry but excluding lights.

Previously defectives were permitted as under:—

Grade 1 — up to — 10 per cent

Grade 2 — up to — 15 per cent

Grade 3 — over — 15 per cent

Prices paid to growers for the various grades were:

"P" Grade (Cherry) 30 to 35 cts. per lb.

No. 1 Grade .. Shs. 1/45 per lb.

F.A.Q. 95 cts. per lb.

Buni 50 cts. per lb.

By the end of the year the co-operative union had collected the following tonnages:—

		Tons
"P" Grade	..	289
No. 1 Parchment	..	3,146
F.A.Q.	..	148
TOTAL	..	3,583

32. A record crop of over 8,000 tons of parchment is forecast. Details of crops produced in the last 12 years are shown in the following table:—

TABLE B.—BUGISU ARABICA COFFEE

Season	Production (parchment)	Estimated value to growers
	<i>Tons</i>	<i>£</i>
1949/50 ..	2,852	184,859
1950/51 ..	3,896	442,104
1951/52 ..	2,203	377,575
1952/53 ..	2,307	633,040
1953/54 ..	3,122	1,231,791
1954/55 ..	6,170	2,015,662
1955/56 ..	4,098	1,349,576*
1956/57 ..	5,175	1,420,353
1957/58 ..	4,805	1,198,602
1958/59 ..	4,912	764,072
1959/60 ..	5,791	1,013,722
1960/61 ..	5,149	953,250

* Includes value of 177 tons of "buni"

(iii) *Bugisu Coffee Improvement Scheme*

33. The assistant agricultural officers appointed under the scheme undertook an intensive campaign to raise the general standard of cultivation in the district and to improve the quality of parchment produced at central pulperies and by individual growers. The campaign met with varying success, but the quality of parchment produced at Buluganya Pulpery was much superior to the ordinary run of parchment produced in the district and the clean coffee was sold at a premium of up to £40 per ton on the Nairobi auctions.

34. Early in the year a five-year development plan financed from funds made available by the Bugisu Coffee Board was brought into operation. The plan covers the following developments:—

- (a) A replanting programme to replace unproductive coffee.
- (b) Introduction of new varieties.
- (c) Seedling production.
- (d) Control of *Antestia* and Lacebug.
- (e) Erection of pulperies.

35. These developments are being integrated with the improvement scheme. During the year two old pulperies were modified and brought into operation, and it is planned to increase further the number operating to five. Routine spraying against *Antestia* and Lacebug continued and 9,350 acres were successfully protected. The average cost was Shs. 31 per acre. Considerable work was carried out on the determination of field populations of *Antestia* to enable closer control to be kept on spraying operations.

(iv) *African-grown Coffee other than Bugisu Arabica*

36. The total production of African-grown coffee other than Bugisu Arabica during the calendar year amounted to 83,283 tons of clean coffee, which was mainly Robusta, but included a small proportion (2,637 tons) of Arabica coffee grown in the Buganda, Western and Northern Provinces. The Robusta crop

was undoubtedly affected by the prolonged dry weather at the beginning of the year but it is also known that, particularly in Buganda, many growers were storing their coffee against an anticipated increase in price for Kiboko early in 1962. That this was so is shown by the comparatively small sales of coffee in November and December which are normally months of heavy sales.

37. The prices paid to the grower for sun-dried Robusta cherry at curing works remained at 50 cents per lb. throughout the year, with corresponding prices for other grades. Details of prices are as under:—

					<i>Per lb.</i>	
					<i>Shs.</i>	<i>cts.</i>
Robusta unhulled (kiboko)	..	..	..	..	0	50
Arabica unhulled (kiboko)	..	..	..	..	0	74
Robusta rough-hulled (containing not more than 2 per cent of husk and/or extraneous matter)	..	..	..	..	0	94
Arabica rough-hulled (containing not more than 2 per cent of husk and/or extraneous matter)	..	..	..	..	1	64
Robusta pulped and washed (parchment)	..	..	..	..	0	85
Arabica pulped and washed (parchment)	..	..	..	..	1	70

38. It is estimated that the value of the crop to the producer amounted to £8,768,248 (excluding Bugisu).

39. Processing was carried out by 14 curing works and seven licensed hulleries. Two new curing works, one in Ankole District and the other in Toro started processing bringing the total of African-owned curing works to eight. Three associations of growers were granted licences to operate estate coffee factories raising the total so licensed to 32. The total amount of coffee processed by factories operated by associations of growers and growers' co-operatives increased from 31,491 tons in 1960 to 33,162 tons in 1961, despite the smaller crop. All the new factories licensed during the year were pulperies, bringing the total to six. For a number of years washed Robusta has commanded a good premium on the world market over the dry processed product and the licensing of pulperies is in accordance with the policy to encourage the development of wet processing in areas where there are abundant supplies of clean water.

40. The marketing of clean coffee (other than that produced by African estate coffee factories owned by associations of growers) remained the responsibility of the Coffee Marketing Board. Prices on the Kampala auctions for both Robusta and Arabica remained steady throughout the year. The price ranges per ton for Standard Grade Robusta and Arabica Grade 30 were £136 to £125 and £255 to £242 respectively.

41. In Buganda the drive for raising husbandry standards was maintained, special attention being paid to *couch* control and proper picking and drying of the ripe cherry. The demand for seedlings was small, requirements being limited to replacement of blanks in established coffee. Some improvement in pruning and weeding was noted but there was little change in the standard of picking. There was however again a good response to propaganda for the use of drying tables and trays; over 4,400 of the latter being purchased during the year at the subsidised price. Unfortunately, wet weather made drying extremely difficult and

the full benefit from the improved drying facilities was not achieved. Heavy flowering took place in all parts of the province in late December and crop prospects were good.

42. Spraying against *Antestia* continued in Toro, Ankole and Kigezi districts in the Western Province and a total of 4,478 acres was successfully protected at an average cost of Shs. 78 per acre.

43. Production figures by districts are given in Appendix IV (b). Details of total production during the last twelve years are as under:—

TABLE C.—AFRICAN COFFEE PRODUCTION
(Other than Bugisu Arabica and African estates)

CURED COFFEE (Tons)					
1950	..	..	26,263	1956	 48,498
1951	..	..	34,363	1957	 61,570
1952	..	..	29,563	1958	 65,292
1953	..	..	26,998	1959	 93,261
1954	..	..	25,196	1960	 107,017
1955	..	..	60,160	1961	 83,283

44. In the Arabica growing areas of West Nile District, following on successful trials with hand pulpers which began in the 1958/59 season, six pulperies were brought into use by co-operatives, and of the 1960/61 crop of 173 tons, 102 tons were sold as parchment.

(v) Estate Coffee Production

45. Estate production during the 1960/61 season amounted to 3,433 tons of clean Robusta and 199 tons of clean Arabica.

46. The following table shows the quantities and estimated values sold by estates (excluding associations of growers and co-operatives) during the last twelve seasons. The decline in production was due to the fall in the world price of Robusta coffees.

TABLE D.—ESTATE COFFEE PRODUCTION (ROBUSTA)

Season	Production	Estimated gross Value
	<i>Tons</i>	<i>£</i>
1950/51 ..	3,846	940,504
1951/52 ..	4,851	1,425,669
1952/53 ..	5,921	1,846,697
1953/54 ..	5,277	2,100,993
1954/55 ..	7,730	1,944,790
1955/56 ..	8,941	2,235,250
1956/57 ..	11,010	2,587,350
1957/58 ..	12,543	3,198,465
1958/59 ..	7,882	1,596,972
1959/60 ..	4,728	650,072
1960/61 ..	3,572	432,212

(vi) Reorganisation of the Industry

47. The proposals for reorganising the coffee industry, which were outlined in the previous report, were considered during the year by the representatives

of the Coffee Industry and are now being further considered by Government in the light of commitments with the International Coffee Agreement and the Inter-African Coffee Organisation.

(vii) *Mustiness*

48. As a result of investigations carried out by the Coffee Research Unit, it was established that mustiness, which has been responsible for very considerable losses in the quality of Uganda Robusta was due to contamination of the beans in the hulleries and curing works with spores arising from the dried cherry which had gone mouldy due to improper drying. Based on these findings all coffee factory owners were required to install dust extracting and suppressing equipment. There was good response from factory owners and the present indication is that action taken so far will go a long way towards alleviating the mustiness problem.

(c) **Tobacco**

(i) *Flue-Cured*

49. Production of this type of leaf is confined to West Nile, Acholi and Lango districts in the Northern Province and Kigezi District in the Western Province. The variety grown was White Gold, which replaced the old variety, Harrison's Special.

50. In West Nile District transplanting started under favourable conditions in March and the work was completed in early July. The acreage established was 1,803 compared with 1,424 acres in 1960. Despite dry spells during May and June stands were satisfactory and all plantings grew well. Yields were generally well above average and a number of leading growers achieved yields of over 1,000 lb. of cured leaf per acre. Purchases of green leaf by the East African Tobacco Company amounted to 9,864,775 lb. from which 1,018,423 lb. of cured graded leaf were obtained.

51. The two co-operative societies curing their own leaf sold 20,642 lb. of leaf to the East African Tobacco Company. Individual farmers, curing their own tobacco, sold 55,443 lb. of graded leaf. The number of farmers operating miniature curing barns increased from 9 to 56. The total crop amounted to 1,094,508 lb., which represents an average yield of 607 lb. per acre and an average return to the farmer of Shs. 675 per acre.

52. In Acholi District unfavourable weather in May and June checked growth and reduced stands. All plantings, however, grew well from late June onwards. Considerable losses were caused by hail. Furthermore, independent curers, unaccustomed to dealing with the relatively quick maturing White Gold variety were unable to cope adequately with all of their leaf at the peak picking period. The total acreage planted was 894 compared with 662 acres in 1960. The East African Tobacco Company purchased 1,992,747 lb. of green leaf from which 221,555 lb. of cured leaf was produced. Independent curers sold 173,069 lb. of graded leaf to the company. The total crop amounted to 394,624 lb. which represented an average return to the grower of Shs. 766 per acre.

53. The Ngai Group Farm, whose members are the only producers of flue-cured leaf in Lango District, planted 13 acres, from which they cured 3,901 lb. of saleable leaf.

54. Marketing of the 1960 autumn crop in Kigezi was completed in February, the total output being 126,300 lb. of cured leaf. The area of the spring crop was 283 acres. The crop suffered from lack of rain and the total output was 80,800 lb. Both crops were purchased as green leaf by the Kigezi Development Company, the prices paid, as in other districts, being 12, 8 and 3 cents per lb. Planting of the autumn crop started in September and the total acreage established was 358 acres. Weather conditions favoured the crop and yields from the early plantings were good.

55. Full details of production of all districts during 1961 compared with those of the previous year are given below:

TABLE E.—FLUE-CURED TOBACCO PRODUCTION

District	ACREAGE		PRODUCTION (Cured leaf)	
	1960	1961	1960	1961
West Nile ..	1,424	1,803	<i>lb.</i> 715,402	<i>lb.</i> 1,094,508
Acholi	662	894	381,232	394,624
Lango	16	13	4,528	3,901
Kigezi	507*	641†	153,000*	207,100†
TOTAL ..	2,609	3,351	1,254,162	1,700,133

* 1959 autumn crop and 1960 spring crop.

† 1960 autumn crop and 1961 spring crop.

(ii) *Fire/Air-cured*

56. The cultivation of this type of tobacco is confined to West Nile District and is best described as "Fire Assisted". The variety grown was Heavy Western.

57. Transplanting started in April and continued until the first week in June. Dry weather in May and early June checked the young crop and reduced acreage potential. The total planted was 1,001 compared with 1,162 acres in 1960. Harvesting started in July. The cured leaf was purchased in four grades as in 1960. Growers again experienced difficulty in grading correctly, but generally the quality of the leaf purchased was better than in the previous season. The prices which were unchanged from 1960 were:—

	<i>Shs.</i>	<i>cts.</i>
Grade I	1	50
Grade II	1	10
Grade III	0	80
Grade IV	0	60

58. The total crop was 527,047 lb. compared with 710,644 lb. of cured leaf in 1960 which was worth £25,257 to the growers. The production target for 1961 was 750,000 lb.

(iii) *Fire-cured*

59. Lack of proper attention to nurseries by growers caused shortage of seedlings in Bunyoro and the total acreage fell from 3,438 in 1960 to 3,219 acres. Dry spells in early April made transplanting difficult but from the middle of the month onwards there was sufficient rain in most areas and when harvesting

started in July the crop looked promising. Only 30 acres were damaged by hail. The heavy rains from late July onwards made curing extremely difficult and losses due to barn rot and moulds were high. As in the case of fire/air-cured leaf the number of grades and prices were the same as in 1960. Despite intensive propaganda the overall improvement in grading was small. Nevertheless, the percentage of Grade I leaf increased to over 20 per cent compared with 9.3 per cent in 1960. Nearly 70 per cent was purchased as Grade III. Despite the exceptionally wet weather during marketing, the average moisture content was estimated at approximately 22 per cent. The total crop was 1,319,832 lb. compared with 1,535,287 in the previous season.

60. In Mubende District lack of interest by growers coupled with dry weather in the main transplanting season resulted in only 308 acres being planted. The established crop grew well, but wet weather from July onwards made curing difficult and caused losses in the barns. 12.2 per cent of the crop was purchased as Grade I, but the overall improvement in grading was small. The total crop was 101,653 lb., which although greater than the 1960 production was well below the production target of 400,000 lb. of cured leaf.

61. Details of production in the last two years in both districts are given below:—

TABLE F.—FIRE-CURED TOBACCO PRODUCTION

District	ACREAGE		PRODUCTION (Cured leaf)	
	1960	1961	1960	1961
Bunyoro ..	3,438	3,219	<i>lb.</i>	<i>lb.</i>
Mubende ..	212	308	1,535,287	1,319,832
			63,003	101,653
TOTAL ..	3,650	3,527	1,598,290	1,421,485

(iv) *Development of Overseas Markets*

62. After a policy review at the end of the 1960 marketing season it was decided that the agreement with Messrs. Edwards, Goodwin should be suspended for one year on the grounds that very little progress was likely to be made in improving quality until primary marketing facilities had been improved. In pursuance of this policy a prototype market in permanent materials together with a temporary growers' shelter was erected at Kitoba in Bunyoro District and brought into use for the 1961 season. The new design proved very suitable and resulted in a marked improvement in the presentation and grading of leaf and its handling after purchase. It is planned to erect five markets to the new design in Mubende and Bunyoro districts next season.

(d) *Oil Seeds*

63. Output of seed from the 1960/61 cotton crop was 142,471 tons of which 117,959 tons were sold to local oil millers and exporters at average prices of Shs. 408/50 per ton for AR and Shs. 391/50 per ton for BR. Planting accounted for 24,312 tons and 200 tons were used as fuel.

64. Sales of groundnuts in the Eastern Province were the highest ever, it being estimated that 18,000 tons of shelled nuts were purchased. The bulk of the sales were in Busoga, where it was estimated 12,000 tons surplus to local food requirements were sold. The prices were considerably lower than in the previous season, averaging 20 to 25 cts. per lb. unshelled. Exports amounted to 9,179 tons.

65. Sales of sunflower seed in the West Nile totalled 300 tons compared with 289 tons in 1960.

66. Sales of shea butter nuts in Teso District totalled 264 tons compared with the five-year average of 334 tons.

(e) Maize

67. The acreage increased in Buganda following high prices in 1960. Much of the crop was consumed in the green state, but the marketable surplus was estimated at 560,000 bags. Prices varied from 8 to 11 cents per lb. In the Eastern Province it was estimated that 130,000 bags were sold, chiefly in Busoga District. In the absence of any statutory obligations on buyers to submit returns, there is no means of knowing whether in fact the above quantities were marketed.

(f) Tea

68. At the end of 1960, the total area of planted tea was 16,840 acres, of which 11,317 acres was in bearing. During 1961 the net increase in licensed acreage was 6,596, bringing the total area licensed at the end of the year to 35,478 acres. Production amounted to 11,278,158 lb. of made tea compared with 10,291,183 lb. in 1960 and was the highest on record. The average price realised for tea which was exported was Shs. 3/46 per lb. and the total export value of the crop was £1,609,822.

69. A scheme was introduced in co-operation with Agricultural Enterprises Ltd., and established tea estates whereby Africans may participate in the tea industry as outgrowers. Under the scheme outgrowers receive stumps for planting on credit after entering into agreement with Agricultural Enterprises Ltd. to sell green leaf. The cost of the stumps will be deducted from the price paid for the leaf. In addition, other Africans planted tea on an individual basis, many taking advantage of loans from the African Loans Fund. It is estimated that African estates and outgrowers had increased their acreage of planted tea to 690 acres by the end of the year.

(g) Sugar

70. A total of 21,461 acres of mature cane was harvested and production from the two estates amounted to 95,500 tons of mill white sugar, compared with the previous record production of 91,117 tons in 1960. Exports to Kenya were 33,000 tons compared with 30,900 in 1960. There were no exports of sugar to Tanganyika during 1961.

(h) Cacao

71. Further planting of cacao in selected areas took place in the Buganda, Eastern and Western Provinces. The acreage planted during the year was 51 bringing the total to date to 180 acres of which 152 were in Buganda. Only Upper Amazon varieties were planted. A small crop was produced by the 1958 plantings

in Buganda and purchased for seed and fermentation trials. Growth generally was satisfactory and there was no serious attack by pests or diseases. In the Eastern Province, however, only those plots planted in forest show promise. The policy is to plant up to 1,000 acres in suitable areas by 1964; and 5,000 eventually.

(i) Sisal

72. Exports of sisal from the one estate near Masindi Port in the Western Province were 710 tons, valued at £64,790 compared with 632 tons in 1960, valued at £51,848.

(j) Minor Crops

73. The area under vanilla continued to increase, but yields were lower than in the previous season owing to excessive rain. Exports amounted to 6,000 lb. valued at £12,515. In 1960, 5,200 lb. were exported.

74. Ginger and turmeric, cultivated for the local markets showed an increase. More recent developments have been the establishment of cardamom and pepper, which will also supply local markets. Seed of selected black pepper was imported from Zanzibar, whilst rhizomes of cardamom was obtained from Ceylon and seed of high yielding strains of the same crop was imported from the Cardamom Research Station in India.

V. AGRICULTURAL DEVELOPMENT AND EXTENSION WORK

(a) Soil Conservation

75. Soil conservation measures were severely tested as a result of the abnormal rains. In the higher parts of the Protectorate, particularly on Mount Elgon and in Toro and Kigezi districts, erosion occurred in localised areas on the steeper slopes. In parts of Bugisu erosion was reported even on uncultivated land and several landslides, one nearly a square mile in area, occurred. In general, however, the severe rains served to demonstrate that cultivated lands in the Protectorate are adequately protected against erosion.

76. Successful agricultural competitions, which included a substantial proportion of marks for soil conservation, were held in all provinces. Progress in most areas was not as great as in previous years, mainly because chiefs were preoccupied with administrative duties. Nevertheless where chiefs took an interest encouraging progress was made. In Masaka District over 70 miles of bunds were constructed and in Busujju County of Mengo an average of 10·8 yards of new bunds was built per taxpayer. In Bugisu District a very high standard of soil conservation was achieved by the winners of the agricultural competition. In the Northern Province considerable improvement was reported in the alignment and maintenance of grass wash-stops throughout the rotation. In all provinces the most marked progress, albeit in relatively small areas, was made on the holdings of progressive farmers, which augurs well for the future.

(b) Agricultural Education

(i) *Main Farm Institutes*

77. During the year a Diploma Course was started at Bukalasa Farm Institute to replace that previously offered by Makerere University College. The full

course occupies four years of which the first two are the same as for the Agricultural Assistants' Course. The third year is essentially a practical one and will be spent at Serere Experiment Station. The minimum standard of entry is the Cambridge School Certificate with a credit in science. The course is designed to train Assistant Agricultural Officers of which there is a great shortage in the Department. Six students were admitted to the course but one was unable to complete the course.

78. Eighteen students successfully completed the three years' certificate course of whom 14 were appointed to the Department, two to the Prisons Department as Assistant Farm Managers, and two to commercial firms. The number of second year students was 41 of whom 40 successfully completed their basic training. New entrants totalled 46 all of whom were in possession of the Cambridge School Certificate; in addition four women students were admitted to the certificate course. This latter development marks the beginning of formal academic agricultural education for women in the Protectorate. A women's hostel to accommodate up to 20 students was completed at Bukalasa in 1961.

79. At Arapai Farm Institute 30 students (including 14 referred at the end of 1960) successfully completed their training and were appointed to the Department as agricultural assistants. There were 40 second-year men of whom 37 passed their examinations. The number of new entrants fell to 19 owing to the raising of the minimum education standard to Cambridge School Certificate.

(ii) *District Farm Institutes*

80. Five District Farm Institutes were in operation and over 900 farmers and their wives attended courses of one to two weeks duration. Both general and specialist courses were given, particular attention being paid to ox-cultivation and the major cash crops. Refresher courses for departmental staff were also arranged. Each institute has a model farm based on local agricultural practice but incorporating improved agricultural methods applicable to the area. Visits to the holdings of progressive farmers in the area form an integral part of the courses.

81. Sites for a further four institutes were selected in readiness for building to start in 1962.

(iii) *Farm Schools*

82. These institutions provide a two-year post-primary course in agriculture for boys academically unsuited for higher studies and who wish to take up farming on their own account. There are now eight farm schools in the Protectorate, of which five are in the Northern Province, two in the Eastern Province and one in the Western Province.

83. At Aler Farm School 18 boys successfully completed their training and left to take up farming on their own account. Nine students completed the course at the Acholi Farm School run by the Verona Fathers' Mission near Gulu. At the Native Anglican Church Farm School near Gulu ten students finished their second-year training. The small farm schools at Koboko in the West Nile District, Kaabong in Karamoja and Bulindi in Bunyoro District operated satisfactorily during the year. At the Muljibhai Madhvani Farm School in Busoga District,

74 students were in residence, of whom 23 passed out at the end of the year. Work progressed satisfactorily at the Amucu Farm School in Teso District throughout the year.

(iv) *Miscellaneous Courses*

84. At Mukono District Farm Institute which is combined with a community development centre, in addition to the normal agricultural course for farmers and their wives, special courses were arranged for women community development assistants and members of the Y.W.C.A. Thirty-nine students attended these courses. All community development courses for women received regular lectures on food crop production with special reference to vegetable growing, crop storage and the use of insecticides. 215 women attended these lectures.

(c) **Animal Husbandry and Pasture Work**

85. Animal husbandry in the field is the responsibility of the Department and the policy aims, where local circumstances permit, at the integration of livestock into a sound system of mixed farming. The traditional practice of communal herding dies hard, but progress towards individual herding was maintained and the development was greatly assisted by the sale of barbed wire under the Agricultural Subsidy Scheme which resulted in considerable areas being enclosed. Most of the paddocks were on permanent grass, but in the Eastern Province leys were also fenced. Night paddocking was encouraged wherever practicable. In many cases after fencing, improvement of the herbage was undertaken by the elimination of undesirable species, particularly *Cymbopogon afronardus*. The use of covered kraals was expanded in south Bugisu, but the increase was small compared with the number erected in 1960. Many farmers improved the construction of their kraals through the Agricultural Subsidy Scheme. The practice of planting elephant grass for stall feeding of cattle continued to spread, particularly in Busoga and Teso districts. In the former district one farmer was successful in keeping two grade Guernsey cows for milk production. Spraying against ticks was carried out twice weekly. In Ankole District in the Western Province, the fifty acres seeded to Molasses Grass and Rhodes Grass in 1960, with a view to providing seed for pasture improvement, was maintained. Unfortunately the stands of Rhodes Grass were poor and little seed was produced for distribution.

(d) **Irrigation and Swamp Reclamation**

(i) *General*

86. Investigational work in co-operation with the Water Development Department continued on four irrigation schemes, on the Mubuku River and at Nyakatonzi in Toro District, at Namalu in Karamoja District and in the Oruchinga Valley in Ankole District. The schemes are designed to ascertain what crops can be grown successfully by African farmers under irrigation.

(ii) *Oruchinga Valley*

87. A wide range of food and cash crops was planted on a five-acre experiment. Good yields were obtained from rice and cotton, whilst plantains grew well. The growth of Arabica coffee, however, was stunted and many deaths

occurred owing to water-logging; European vegetables yielded poorly for the same reason. A further trial plot of five acres comparing times of application of water was a failure as supplementary irrigation became unnecessary owing to the heavy rain. Crop yields were however good, over 2,000 lb. per acre of grain from finger millet being recorded.

(iii) *Nyakatonzi*

88. Approximately 40 acres were under trial during the year, but owing to heavy rains little irrigation was necessary. Cotton again grew well as also did Arabica coffee, sugar cane, maize and plantains. The cocoa trial made only poor growth.

(iv) *Namalu*

89. Work was on a much reduced scale owing to a leak in the dam wall and no development of the holdings demarcated in 1960 could be considered. Robusta coffee continued to do well under irrigation.

(v) *Mubuku River*

90. This project consists of five 15-acre farms along the main irrigation channel. The farms were handed over to selected tenants with the object of ascertaining how successfully tenant farmers can operate their holdings under the relatively rigid time-table necessary for the practice of irrigation. Progress during the year was very satisfactory. The tenants quickly adapted themselves to the new method of husbandry and although the first crops were disappointing the later plantings which have not yet been harvested are most promising. It is estimated that approximately 12,000 acres in the area are suitable for irrigation from the Mubuku and Sebwe rivers. An aerial survey of the area, with a view to providing contour maps, was started during the year.

(vi) *Sugar Estates*

91. Irrigation on an extensive scale is already being used for sugar-cane by commercial organisations and at the end of the year over 4,000 acres were under irrigation by the sprinkler method.

(vii) *Swamp Reclamation*

92. Further swamp reclamation was carried out by the Water Development Department in the heavily populated parts of Kigezi District, chiefly in the Kiruruma and Kashambya swamps, where over 600 acres were drained. In addition, small areas in other swamps were opened up by the people themselves. The area so drained was estimated at 200 acres. Yields of up to 10 tons per acre of sweet potatoes and 2,000 lb. (threshed grain) of sorghum were recorded on the reclaimed areas. Considerable swamp drainage was also undertaken by the local people in Ankole District.

93. Swamp fringes in many parts of the Protectorate were utilised for dry season planting of sweet potatoes, chiefly for providing planting material for the following year; to a lesser extent other crops, such as maize and beans were planted.

(e) Resettlement

94. During the year the following resettlement areas were in operation in the Western Province.

Kigezi District—Kihhi, Bwambarra and Rwanga.

Toro District—Bigodi, Nkongora, Kahunge and Nsinde.

Ankole District—Bigyera, Nyansimbo, Chezo, Kisharira and Kakinga.

95. The Bwambarra area in north Kigezi was closed to settlement in July as all available land had been allocated. In Kihhi the number of new settlements was 1,450. Flue-cured tobacco was the main crop grown by settlers.

96. Thirty-three families of Watutsi refugees were settled during the year in Kahunge and a further 22 Bakiga settled in Nsinde. Farms allocated varied from 10 to 20 acres in area and settlers were supplied with seed and planting material.

97. The Bigyera and Nyansimbo areas were closed for settlement and a new area was opened at Kakinga, where 137 families took up holdings. No settlement took place in Chezo or Kisharira. In November the Oruchinga Valley was opened to organised settlement for refugees from Ruanda Urundi and by the end of the year approximately 2,000 had been settled.

98. The south Busoga Resettlement Scheme received a setback owing to a serious outbreak of sleeping sickness, the number of cases rising to 101 compared with 18 in 1960. The outbreak is mainly attributed to haphazard allocation of land by Mitalla chiefs—a difficulty which had not been entirely overcome at the close of the year. Settlers entering the scheme during the year numbered 317 compared with 988 in 1960.

(f) Kigumba and Ntoma Settlement Schemes

99. At Kigumba the number of families settled increased from 395 to 435. The settlers, the majority of whom are Maragoli cultivated 732 acres of cotton as part of the pedigree seed increase scheme. In Ntoma, where settlement started on a small scale in 1959 the number of families increased from 53 to 135 during the year. The two settlements are designed to form a tsetse barrier to prevent southwards migration of the fly.

(g) Liaison with African Local Governments

100. Close liaison was maintained with senior officers of African local governments and chiefs in general agricultural extension work, particularly maintenance of food supplies and soil conservation. Successful agricultural competitions and shows, which were arranged in most districts are evidence of the close co-operation achieved.

(h) Mechanical Cultivation

(i) Policy

101. It is the policy of the Department to use the Contract Hire Service to pioneer the development of mechanical cultivation where this is deemed desirable and to move to new areas when farmers themselves and other organisations are capable of operating their own tractors and equipment. The policy of replacing with diesel models the petrol and kerosene tractors of the Contract Hire Service was continued and by the end of the year all except the Bunyoro units had been equipped with diesel tractors.

(ii) *Contract Hire Service*

102. Tractor units continued to operate in Buganda and in Busoga, Bunyoro, Acholi, Lango and Toro districts and Madi Sub-district. The Bunyoro unit was withdrawn at the end of the year owing to lack of demand. The total area cultivated was 8,187 acres compared with 5,739 in 1960. There was a welcome revival in demand for the service in Buganda where the acreage cultivated was nearly treble that dealt with in 1960. In Busoga and Lango districts the acreages cultivated were approximately double those of the previous season. In Acholi District, although only 1,244 acres were cultivated by the Contract Hire Service it was estimated that private tractors in the district covered over 4,500 acres. Comparative figures of acreages cultivated in all districts in 1960 and 1961 are shown below:—

TABLE G

Province or District	Ploughing		Discing		Planting		Weeding and Ridging	
	1960	1961	1960	1961	1960	1961	1960	1961
Buganda ..	600	1,791	225	298	66	81	—	—
Bunyoro ..	393	484	10	6	15	6	—	—
Toro ..	692½	761	537½	408	64	62	32	18
Acholi* ..	1,122	992	215	203	4	—	34	49
Lango ..	1,166½	2,002	102½	154	6	—	—	—
Busoga ..	272½	642	161½	230	8	—	12	—
TOTAL ..	4,246½	6,672	1,251½	1,299	163	149	78	67

* Includes Madi Sub-District.

103. The number of tractors operating was 34 of which 13 were Ferguson 35 (Diesel), seven Fordson Major (Diesel), six Farmall B.E.M. (Kerosene) and eight Fordson Dexta (Diesel). The running costs for all operations worked out at Shs. 20/67 per hour, compared with Shs. 23/75 in 1960. Hire charges per acre remained at Shs. 45 for ploughing, Shs. 25 for discing and Shs. 15 for weeding and planting, but these charges include a heavy item of subsidy as the hire units are run at a loss. The total revenue earned by the service was £19,000 compared with £13,500 in 1960. The pool of specialised equipment provided for hire by farmers owning tractors again proved popular.

(iii) *Purchase of Tractors by Farmers*

104. In order to encourage progressive farmers to run their own tractors and to carry out mechanical cultivation for their neighbours on payment, Government agreed to subsidise the cost of 4-wheeled tractors as to 25 per cent of the cost or £200 whichever is the less. One condition of this subsidy was that the owner or his driver should have attended a Tractor Drivers Course at Namalere.

105. A census of privately-owned African tractors showed that there were 70 tractors of over 10 h.p. and 7 under 10 h.p. in use. Regular advice and assistance with maintenance was given to private tractor owners by the Special Development Section.

(iv) *Investigational Farms*

106. Senge Farm ceased to be run as an investigational farm and was placed on a care and maintenance basis.

107. Kigumba Farm in Bunyoro District was again run as a fully mechanised farm by the Special Development Section for the multiplication of pedigree cotton seed. Full advantage was taken of all available mechanised farming techniques to secure maximum seed multiplication. In 1960/61 the average yield was 962 lb. of seed cotton per acre from 160 acres. After a promising start the 1961/62 crop suffered severely from the heavy rains in the last quarter and at the end of the year an average yield of only 325 lb. per acre was forecast. The herd of cattle kept on the farm as part of the Department's cattle breeding scheme in the Western and Northern Provinces was reduced from 441 head to 321 by severe culling.

(v) *Machinery and Testing Development*

108. The Special Development Section continued to be responsible for the testing and development of both tractor and ox-drawn implements and close liaison was maintained with the East African Tractor and Implement Testing Unit. Work continued on the testing of small mechanical cultivators suitable for weeding coffee. In the tests particular attention was paid to the longevity of the various attachments and the modifications necessary to improve this feature of the implements when working under local conditions. Other projects under investigation included the following:—

- (a) A pilot groundnut processing plant.
- (b) A small contractor's bush clearing implement.
- (c) A groundnut picker.

109. In co-operation with the Agricultural Officer (ox-cultivation) and district officers considerable success was achieved with the development of row planters and it is hoped that the most successful of the three prototypes, the "Bentall" seeder, which was developed in co-operation with a private firm, will be brought into commercial production in 1962. This seeder is primarily a hand implement, but can be fitted to a number of cultivation implements. Another prototype, the "Todd" seeder is being manufactured locally and proving popular in Teso District.

110. The ox-drawn tool bar, trials on which were started in 1960, was found to be insufficiently robust for local conditions and detailed specifications for a new prototype were agreed in consultation with representatives of the National Institute of Agricultural Engineering.

111. An interesting development during the year was the introduction of the Indian system of ox-draught, whereby the implement is pulled by a wooden beam by a pair of oxen controlled by one man walking behind the implement. The system shows considerable promise of being suitable for adoption generally in Uganda.

112. In conjunction with the Coffee Research Unit, various modifications were made to the wet processing factory at Namalere. Extensive trials were carried out using power-driven coffee hullers suitable for use by African farmers for the production of rough-hulled coffee. The hullers tested were Gordon No. 5, McKinnon No. 5, and Bentall No. 5. Following the trials mobile hulling units were established which carried out hulling of sun-dried

cherry for a small fee in order to demonstrate the machines to farmers and encourage the adoption of rough-hulling.

(vi) Tractor Training School

113. Two three-month courses were held at Namalere Tractor Training School. A total of 28 students, comprising mainly progressive farmers and their sons attended the course. Short practical courses were also held for students from Arapai and Bukalasa Farm Institutes.

(i) Ox-drawn Equipment

114. It is the policy of the Department to expand the use of ox-drawn equipment to new areas and at the same time to widen the range of implements used, particularly seeders and inter-row weeder.

115. Demonstration teams operated in all districts in the Western Province, but response by cattle owners, the majority of whom are pastoralists, was again disappointing.

116. Eleven demonstration ox teams were maintained in the Eastern Province and in addition ox teams, also with a full range of equipment, were in regular use at cotton variety trial centres. The greatest progress in the province was made in Teso District, where it is estimated over 2,000 plots of all crops were planted in rows, using mainly the newly developed "Todd" seeder. Purchasers of ox-weeders in the same district rose to 112 compared with 29 in 1960. In the Northern Province progress was slow, but in Lango District eight seeders and 35 ox-weeders were purchased by farmers during the year. In the same district over 1,000 farmers made day trips to Ngetta District Farm Institute to see demonstrations of ox-drawn equipment.

117. In Buganda little interest was shown in the use of oxen, except in Buruli, Bugerere and Singo counties, where a few farmers purchased ploughs.

(j) Progressive Farmers

118. Departmental policy aims at developing a class of yeoman farmers as the spearhead of agricultural development. In pursuance of this policy an Agricultural Subsidy Scheme and a Progressive Farmers' Loans Scheme were brought into operation. The object of the subsidy scheme is to make available to as many progressive and emergent farmers as possible the implements and equipment they need and at a price they can afford. A wide range of agricultural equipment was purchased including coffee trays, ox-carts, inter-row weeder, coffee pulpers and barbed wire. In the Eastern Province, where the widest use was made of the subsidy scheme, it is estimated that agricultural equipment to the value of Shs. 200,000 was purchased by farmers. The Progressive Farmers Loans Scheme is designed to provide credit for farmers who agree to carry out improved agricultural practices. Credit worthiness is assessed on the character, integrity and the farming ability of the individual farmer, together with the productive capacity of his farm and of the new practices being introduced. The initial response to the two schemes, which are in fact complementary, has been very encouraging.

119. Interest in farm planning was well maintained. The number of farms planned during the year was 107 of which 25 were in the Northern Province, where the service was offered for the first time in 1960. Most progress was made in the Eastern Province, where 45 farms were planned bringing the total to 75. Some planned farmers experienced difficulties in repaying loans, but in general good progress was made in developing holdings. Where possible enclosure of land was encouraged and in Kigezi District where this development is most advanced, 99 holdings were enclosed with live fences and a further 173 partially enclosed.

120. In Buganda considerable interest continued to be shown in farmers' clubs. The most active area was Singo county, where the number of clubs increased from 21 to 41 during the year: each club in the county had 20 to 30 active members.

VI. INVESTIGATIONS

121. The following is a brief report on the investigational work undertaken by the Research Division during the year. The full report is published as Part II of the Annual Report of the Department of Agriculture for 1961.

(a) General

(i) *Weather*

122. Abnormal rainfall distribution created a number of managerial problems and affected both crop yields and animal production. At Serere a severe dry season which delayed land preparation was followed by inadequate rains in April and May. This was aggravated by a severe attack of army-worm at the end of March. Heavy rains from June onwards complicated the harvesting of the early crops and precluded proper cultivation of the land for the late crops. The total rainfall of 71·75 inches in 186 days is the highest recorded at Serere since the station was opened in 1921. This was made up of 24·56 inches in the first six months compared with an average of 26·47, and 47·19 inches during the rest of the year compared with an average of 26·81. At Kawanda the early rains were adequate and well distributed. From July onwards, however, rain was excessive and even the dry days were dull, cool and overcast. The rainfall total for the period July to December was 41·78 inches on 113 days, which is almost equal to the annual average for the station—just over 45 inches.

(ii) *Kawanda Farm*

123. Some major policy decisions affecting Kawanda were made during the year. It was decided to place greater emphasis at Kawanda on the experimental work relating to perennial crops. Consequently, plans were made to increase, as rapidly as possible, the permanent crop acreage to at least twice the present figure. In the dairy unit it was decided to replace the herd of Nganda cattle with Jerseys. At the Costings Farm an arable rotation was introduced in addition to the coffee and livestock.

124. First rain crops in general yielded well, groundnuts averaging 1,389 lb./acre dried nuts and maize over 2,000 lb./acre dry grain. Beans, on the other hand did less well, averaging only 414 lb./acre.

125. In the heavy second rains, groundnut yields dropped to 560 lb./acre, beans failed entirely and late maize yields were poor. Sweet potatoes gave a low average yield due partly to declining yields in the Mayanja swamp. However, on the Kababi area, 8 tons/acre were obtained.

126. Cotton averaged 537 lb./acre (NC 60) in the 1960/61 season, compared with a previous seven-year average of 516 lb./acre. The 1961/62 season was poor for cotton from July onwards; rainy and cool overcast conditions prevailed, vegetative growth was excessive, and poor yields were expected. Picking was delayed until late December.

127. In the Mayanja swamp, a 500,000-gallon valley tank was constructed by the Water Development Department together with a feeder drain tapping a number of springs in the vicinity. The drain will feed the tank during the dry season when the Mayanja River normally dries up. Several small cambered beds were erected; the effect of the improved drainage being rapidly apparent in a change from dominantly swamp vegetation to a lush growth of soft weeds. It had been proposed to construct similar cambered beds over the whole irrigable area, but weather conditions prevented any attempt being made and only a small amount of hand cultivation was carried out. An examination of levelling costs for furrow irrigation revealed that the expense would be prohibitive, and it was consequently decided to use overhead irrigation of cambered beds.

128. The Costings, Projects and Management Farm has progressed well. The farm as a unit is still not profitable, but individual projects such as the stall-unit and the improved broiler-unit have shown good profits. There has been a change from previous Costings Farm policy (Annual Report 1958), in the decision to consolidate the coffee acreage, to include one acre of Arabica in the original coffee mulching strips, and to develop the remainder of the area as an arable rotation. The first two crops in this rotation, cotton, have suffered from the weather and seem unlikely to provide an economic return. All *Tilapia* were removed from the fish-pond which was then deepened and restocked with 50 Israel carp. *Tilapia* have been introduced into the Mayanja valley tank, where, with a small number of Nile Perch, they appear to be flourishing.

129. The introduction of oxen to the Costings Farm is the next step, particularly since labour requirements have been increased considerably by the introduction of an arable break and the increasing coffee crop.

(iii) *Serere Farm*

130. The established lines of investigation into the breeding and management of cattle, the search for new pasture species, the evaluation of improved leys by grazing trials, methods of maintaining and improving soil fertility, and control of insect pests on cotton were all continued. In addition a large-scale investigation of groundnut varieties and factors affecting yields of this crop was initiated. Other work was undertaken with millet, cowpeas, sim-sim and sweet potatoes and the station acted as a bulking area for two new varieties of maize bred at Kawanda.

131. A cotton breeder, a member of the staff of the Empire Cotton Growing Corporation, continued working at Serere on the breeding of cotton varieties suitable for the Eastern and Northern Provinces. The effects of spacing and

planting date on cotton yields were also examined at several sites. Seed of the improved varieties was grown at Serere and early in the year Segregated Area I was supplied with the variety S.60, while S.61 was bulked on the main farm during the year, ready for issue in 1962.

132. The Sorghum Research Unit, a section of the East African Agriculture and Forestry Research Organisation, continued to investigate techniques of sorghum breeding. The unit consists of two senior staff who, besides carrying out detailed breeding work at Serere itself, were able to avail themselves of the facilities offered at sub-stations to carry out an extensive series of trials comparing hybrid sorghums with normal sorghum varieties and with maize.

133. A major effort was made in the dry season to continue with the "cleaning-up" operations in the 450 acres around the outskirts of the farm, which had been cleared by machinery late in 1960. At the break of the rains prolific regeneration of Lantana occurred in the newly cleared area. Great success, however, was achieved early in the rains by the application of a spray of 2-4-D. A 100 per cent kill was obtained in the areas sprayed. Areas which could not be treated because of the danger of damage to cotton in adjacent fields, will be sprayed in 1962.

134. The year has seen the completion of the perimeter fence and the erection of a considerable mileage of fencing for new paddocks. By the end of 1962, the newly cleared areas should be completely fenced to give the extra paddocks which are required to accommodate the increased cattle numbers needed for the breeding scheme.

(b) Soil and Land Use Surveys

135. The Soil Survey Officer issued the following reports during the year:—

1. Soil Survey of the Lake George Flats, Toro.
2. Soil Survey of Mwenge Tea Estate, Toro.
3. North Ankole Tea Outgrowers' Area near Kibingo, Igara County, Ankole.
4. Soil Survey of Rwebitaba Estate (site of the proposed tea research station).
5. Soil conditions in the proposed Tea Outgrowers' Area, Bugambe, north Hoima.
6. Bunyoro Enterprises Sisal Estate, Masindi Port.
7. Proposed Tea Estate near Atyenda, Okere County, West Nile.

In addition the field work was completed of soil surveys of the departmental stations at Kawanda, Kituza, Bukalasa, Abi, Bulindi and Bugusege, and the resurvey of Serere Research Station was begun. The Soil Survey Officer also helped to draw up a plan for the resettlement of refugees in south Ankole.

(c) Soil and Plant Chemistry—General

136. In the second cropping year of an experiment to measure the soil regenerative effects of various grass treatments, no significant differences in the moisture status of the top soil were noted, whereas, in the first year, the continuously cropped plots were drier during the early part of the season and also had much lower yields. The 1961 crop of sweet potatoes showed no yield responses to the treatments.

137. The experiment using heavy phosphate treatments was continued at Kawanda, the treatments being repeated on cotton. There were no visual growth responses to the phosphate although there were to the supplementary dressings of fertilizers containing nitrogen, potash and magnesium. Broadcast superphosphate just significantly increased the concentration of phosphorus in the leaf. A small trial comparing the effects of sodium nitrate and ammonium sulphate on cotton growing on old land showed no significant difference between the two forms of nitrogen. These experiments support the view that at Kawanda, on a typical deep Buganda loam, cotton probably responds to nitrogen and potash but not to phosphate or sodium.

138. On the permanent annual crop manurial experiments at seven stations in Buganda and Western Province the main responses have been to ammonium sulphate and cattle manure, while superphosphate and potash only occasionally have any effect. In the Eastern and Northern Provinces also, long-term trials continued to demonstrate the benefit to all crops of small dressings of farmyard manure.

139. At Serere in the long-term fertility experiment the replicates which commenced their 6th cycle of the 5-year rotation received applications of inorganic fertilizers for the first time. Sulphate of ammonia and single superphosphate, each to provide 40 lb. per acre of the respective nutrient, were applied in the seed bed and it is interesting to note that the residual benefit which has been observed for many years due to small repeated applications of farmyard manure is probably a phosphate effect. The effect of added inorganic phosphate fertilizer was less on the manured plots. However, a residual benefit due to sulphur cannot be ruled out.

140. The results of fertilizer trials on cotton, groundnuts, sorghum, coffee, and pasture grasses are recorded elsewhere in this report, under the appropriate crops.

(d) Pesticide Research

141. Further trials with aminotriazole have been postponed pending the findings of the United Kingdom Ministry of Agriculture and Fisheries Committee on Toxic Substances.

(e) Stored Products Pests

142. Investigation of the pests attacking stored products was continued and a pamphlet entitled "Storage of Agricultural Produce" has been published for the officers of the extension services and the general public. Varieties of cowpeas have been tested for their relative susceptibility to attack by *Bruchidae* and a method of control has been found, using gamma BHC dust. Tests with Malathion have also been carried out.

(f) Chemical Analysis

143. A new method of eliminating phosphate interference with the determination of calcium has been made routine and sodium, potassium and calcium can now be rapidly measured on the direct reading flame photometer, while magnesium and manganese are determined with a spectograph using spark excitation. Currently nitrogen, phosphorus, sulphur, potassium, calcium, magnesium,

manganese, iron and boron are determined in plant material while routine soil analyses include total nitrogen, available phosphate, nitrate, exchangeable bases and hydrogen, pH, organic carbon, clay and silt.

144. Over 2,000 soil samples, 2,800 leaf samples and a number of samples of irrigation water, coffee effluent, paint and groundnuts were analysed during the year. Clay separations were prepared for selected soils for X-ray analysis at Cambridge and heavy mineral separations from the associated sand fractions were also made.

(g) Crop Investigations and Research (Annual Crops)

(i) *Maize and other Cereals*

145. Variety trials at fourteen centres were conducted in the early rains of 1961 to compare the yielding abilities of newly selected maize hybrids. With the exception of one centre, Iki-Iki, the yield level was generally high in spite of a mid-season dry period. The triple hybrids, 5314 RRM/58 (AFR029 × Katumbili × Muratha) and 534 RRM/58 (Katumbili × AFR029 × Muratha) gave consistently good yields and show considerable promise for areas where a medium-term, high-yielding, white dent maize is acceptable.

146. Two further selections have been made from Muratha, BR. 11 and BR. 29, and results from preliminary trials at Kawanda and Bukalasa indicate that these approach the best local hybrids in yield.

147. A very severe attack of army-worm spread across Uganda at the beginning of the rains and did considerable damage to early planted cereals. Control was readily obtained with a single application of 25 per cent D.D.T. miscible liquid at 3 pints of the concentrate to 8 gallons of water per acre. A 10-foot barrier of spray, either on vegetation or bare earth was sufficient to prevent army worm larvae spreading into a sorghum trial.

148. A trial was laid down on the control of central shoot fly of sorghum (*Atherigona indica infuscata* Emd.) comparing two rates of B.H.C. dust and sprays against untreated sorghum, each plot being split for dressed or undressed seed. The seed dressing used was 50 per cent dieldrin wettable powder and was applied dry at 4 oz. of active ingredient per 100 lb. of seed. The treatments were four weekly applications, beginning at 7 days from emergence, of:—

- (a) 1 per cent B.H.C. spray.
- (b) $\frac{1}{2}$ per cent B.H.C. spray.
- (c) 1 per cent B.H.C. dust.
- (d) $\frac{1}{2}$ per cent B.H.C. dust.
- (e) Untreated control.

149. The seed dressing had no effect whatsoever on the shoot fly attack nor on the stand. The earlier counts of numbers of dead hearts showed that the B.H.C. treatments significantly reduced the attack of shoot fly and that the 1 per cent spray was best. A week after cessation of the treatments there was no significant difference between any treatment and the control. Both sprays slightly scorched the young sorghum plants. The experiment was taken through to yield but there was no significant difference between the numbers of harvestable heads per plant or the final yields from different treatments.

150. The major work carried out with cereals at Serere during the past year has been the responsibility of the Sorghum Research Unit of the East African Agricultural and Forestry Research Organisation. This unit, working for all the territories in East Africa, is essentially studying breeding techniques. More specifically it is investigating methods of increasing bird resistance in palatable varieties of sorghum, the possible use of hybrids to get better yield potential and the use of tetraploids to gain a greater degree of stability in the hybrids. Other work is concerned with means of controlling the serious weed, *Striga*. Trials were carried out on more than 20 sites throughout Uganda to compare imported hybrid varieties from U.S.A. and Israel with local Uganda sorghums and with maize. The unit reports that although it is not possible to draw firm conclusions from the results of trials in only one year, the indications are that hybrid sorghums are potentially of great benefit. The results generally reaffirmed that sorghum should have an important place in the economy of the drier and less fertile areas, whereas maize outyielded the sorghum in the wetter areas. It seems unlikely that short-term maize varieties will usurp the place of sorghum in the "harder" areas.

151. The collection of varieties of finger millet at Serere was maintained. In an interplanting trial with sorghum it was shown that there was little gain in gross yield from planting a mixture of finger millet and sorghum compared with planting half of the total area with each crop in pure stand. Other trials with finger millet at sub-stations were concerned with the comparison of row-planted and broadcast finger millet.

152. Yield increases of up to 800 lb. per acre of sorghum were obtained by the use of a range of nitrogenous fertilizers. Basal phosphate and sulphur were applied and only minor differences between different nitrogenous fertilizers were apparent. However, it did appear that a nitro-chalk type of fertilizer gave better responses than sulphate of ammonia when applied as a top dressing at flowering time.

(ii) *Beans*

153. The collection of the bean varieties known to exist in the Protectorate is now completed. The number of distinct types is 145. All the varieties were tested for field resistance to anthracnose and *Isariopsis* leaf spot, the two main diseases on beans in Uganda. None of the bush types has shown any notable degree of resistance to either disease, but six semi-climbing types and five climbing varieties exhibited good resistance. Anthracnose-resistant selections from the variety "Banja" maintained their resistance but they were all susceptible to *Isariopsis* leaf spot and they suffered severe infection during the second rains. Nearly all Mutike-4 lines which had been selected in 1960 on vigour of growth and yield potential, suffered heavy infection of both diseases.

(iii) *Castor Seed*

154. Two new species of gall midge (both new spp. of *Asphondylia*) were bred from male castor flowers at Kawanda. Infested flowers fail to open but the attack never seems to reach 100 per cent and sufficient flowers open to ensure pollination. The midges need not therefore be considered as important.

(iv) *Sesamum*

155. A considerable number of varieties of sim-sim were tested at Serere and, although the yield level was generally low, a selection from a locally grown variety proved to be the highest yielder. This was surprising since it was more than double the yield of the imported Tanganyika Morada variety which in previous years had been thought to be the best one for this area. It is hoped in 1962 to lay down detailed experiments at a number of centres in the Northern Province to compare the best of the varieties in the Serere collection.

(v) *Groundnuts*

156. The new programme was initiated by collecting the types grown throughout Eastern and Northern Provinces. Twenty-four detailed variety trials were carried out at Serere and at sub-stations throughout the two provinces. In half of these the newly imported Natal Common from Tanganyika, which was believed to be the type required by the confectionery trade, was compared with the standard Red Valencia commonly grown throughout Uganda, with another spreading type from Tanganyika and with two local spreaders from Teso and Busoga. All varieties did not react in the same way at each site, but, overall the Natal Common gave similar yields to the Red Valencia and the Tanganyika Mwitunde spreading type. These three varieties, however, all yielded 300 to 400 lb. per acre more unshelled nuts than the two local spreading types. In the remainder of the trials a Spanish Bunch type, which has been grown at Serere for years, was inserted in place of Natal Common. This variety proved to be the highest yielder and outyielded the Red Valencia by about 300 lb. Again Mwitunde yielded only slightly less than the Red Valencia and the two local spreading types yielded some 300 lb. per acre less. It is unfortunate that the Spanish Bunch which yielded so well has disadvantages which make it unattractive to the grower; it is small podded, very difficult to remove from the plant, and the pods tend to remain dirty. In addition the seed size is rather smaller than the trade requires. The Natal Common grown has characteristics similar to the Spanish Bunch and at present it would appear that little is to be gained by replacing the more usual Red Valencia type by either of these paler skinned varieties unless there is a very substantial differential in the market price.

157. The relatively poor performance of the local spreading types may have been due to poor germination. It is interesting that this difficulty arose with seed which was bought from the local farmers from many different areas and it suggests that many farmers may have this trouble every year.

158. It has long been recognised that a good stand is essential if severe damage by the rosette virus of groundnuts is to be avoided and good yields obtained. Experiments were therefore, carried out to study whether a seed dressing will improve germination and early establishment. It was found that, on groundnuts which were shelled by a machine and stored for some time before planting, a range of different fungicidal compounds all materially benefited stand and eventual yield. When the seed was shelled by hand and planted immediately, the benefit to be derived from a seed dressing was reduced. It would appear that the major problem is the control of a fungus or other micro-organism which attacks the seed very shortly after germination occurs.

159. The importance of spacing both in bunch types and in spreading varieties was again confirmed in a series of trials carried out at Serere. Generally speaking the very close spacing of one foot rows with seed planted one inch apart in the row, gave the best results but since this uses a very high seed rate and would, therefore, be extremely expensive it was interesting to find that the lowering of yield by widening the space between the rows to two feet was not serious provided the intra row spacing did not exceed three to four plants per foot.

160. Another experiment showed very conclusively the major effect of planting date on the yield of the crop. Nuts which were planted at the break of the rains in the third week of March yielded slightly over 2,000 lb. per acre. On the other hand, nuts planted three weeks later yielded between 500 and 1,500 lb. per acre depending on variety, and a further three weeks' delay in planting reduced yields in certain cases to 200 lb. It was clear that different varieties reacted in different ways to the delay in planting and this important point will need to be studied further.

161. Preliminary work was carried out to study whether leaf spot *Cercospora* affected yields and whether there was any means of controlling it. A preliminary late planted trial, which automatically meant that the leaf spot was more important, showed that yields could be almost doubled by controlling the disease with Bordeaux Mixture or by the application of sulphur dust.

162. A large-scale programme of fertilizer trials with groundnuts was initiated this year. At Serere the importance of phosphate was demonstrated as the most consistent effect. On the other hand both lime and potash also appeared to be important and there was interaction between the three fertilizers. The largest yield differentials obtained were as much as 600 lb. per acre and this, if proved to be consistent, would be an economic increase. More than 100 pairs of small plots were laid down on farmers' land in various parts of Eastern Province to test superphosphate manufactured at Tororo. An average overall gain from this simple fertilizer treatment of about 280 lb. per acre of unshelled nuts was found. However, results were very variable and since detailed trials in previous years tended to show lesser benefits, much more work will need to be carried out before detailed recommendations can be made.

(vi) Cotton

163. At Kawanda, Bukalasa and Ssenge in continuation of the investigations into the control of spiny boll-worm and *Lygus* by spraying, formal spacing $\times$ spraying trials were laid down, but picking was still incomplete at the time of writing.

164. A new species of mite, *Eotetranychus* nr. *deflexus* (McGregor) was found at Kawanda and subsequently discovered to be widespread in cotton areas. It does not appear to be very serious, but it is a potential pest, particularly in the D.D.T.-spraying areas.

165. At Serere, in trials on cotton pest control, the findings in 1960 that four sprays of 25 per cent D.D.T. miscible liquid at 15-day intervals gave better results than four sprays at either 10-day or 20-day intervals was confirmed. The best treatment gave a yield of 775 lb. per acre whereas the unsprayed cotton

gave only 120 lb. per acre. Two trials were carried out to compare the standard 25 per cent D.D.T. miscible liquid with other formulations of D.D.T. and with other insecticides. In both trials D.D.T. miscible liquid was the most effective. In one trial the cotton sprayed with D.D.T. miscible liquid gave 275 lb. per acre while from plots on which other insecticides had been used yields of between 50 and 100 lb. per acre were obtained.

166. Spraying trials on cotton were also conducted at three centres in Western Province and one in West Nile where spraying had not previously been shown to be beneficial.

167. The trials in Toro, at Kasese and Nyakatonzi, gave no yield increment from spraying at any time during the crop's growth. At Kasese unsprayed yield was 373 lb. per acre and the best sprayed yield was only 31 lb. higher, at 404 lb. per acre. At Nyakatonzi, spraying in general depressed yields, albeit not significantly, unsprayed cotton yielding 718 lb. per acre versus 703 lb. per acre for the best, and 555 lb. per acre for the worst spray treatments. At neither locality did much pest attack develop and even the usual late stainer attack did not materialise.

168. The third trial, in Kigezi, contained a range of planting dates in addition to different spray schedules. The cotton planted with the break of the rains gave no response to spraying, but later plantings showed the benefit of insect control although they gave progressively less yield; the final planting, on 23rd September, was not picked, as yield was low (approx. 30 lb. per acre) and all stained. All plantings gave a high percentage of low grade cotton due, mostly, to a very severe late attack of spiny boll-worm (*Earias* spp.)

169. The farmers plot trials in West Nile gave much more satisfactory results. Yield increases ranged from 179 to 748 lb. per acre, with mean increases at Aringa of 446 lb. per acre (1,080 versus 634) and in West Madi 381 lb. per acre (1,081 versus 700).

170. A planting date trial carried out at Serere showed that mid-April planting gave 850 lb. per acre, mid-May planting gave 370 lb. per acre and mid-June planting gave only 15 lb. per acre. Once again the very great effect of planting date on production has been demonstrated, and furthermore, the later plantings gave a very much higher percentage of stained cotton than the early plantings.

171. Spacing trials at Serere and at sub-stations have again indicated the importance of a good stand of the crop. Spacings wider than 3'×1' have, in general, given the poorest results and the general trend was for even closer spacings to be best this year, when the resultant earlier maturing cotton suffered less from boll rotting. It is unfortunate, however, in many of these cotton trials that yield levels were too low to enable much reliance to be placed on the results.

172. Results from farmers' trials with cotton in the Eastern and Northern Provinces are not yet fully available, but it would appear that a mixed nitrogen/phosphate/sulphur dressing of fertilizer has resulted in yield increases. In some cases these increases are substantial but are not necessarily sufficient to form the basis of an overall recommendation which would prove economic. In detailed trials at Serere on average to good land, nitrogen reduced yields, largely due

to retarding the maturity of the crop and making it more susceptible to rotting on the plant. Application of sulphate of ammonia at rates up to 80 lb. of nitrogen per acre depressed yields by 20 per cent, while phosphate and sulphur treatments increased yields by up to 10 per cent.

173. In one particular trial which investigated the effect of spacing on cotton which was fertilised in different ways, there was an overall gain of 12 per cent by planting the crop in 26" instead of in 30" rows but interaction of plant population with fertilizer treatment was only poorly determined due to high variability in the experiment.

(h) Perennial Crops

(i) *Coffee*

BREEDING—ARABICA COFFEE

174. In the intermediate variety trials at Kawanda (3,900 ft. M.S.L.), Bududa (4,000 ft.) and Bugusege (4,400 ft.), two Lyamungu selections, KP 423 and N 81, yielded well at all centres. These two and another Lyamungu selection, KP 162, will be compared with three Kenya varieties, SL 14, SL 28 and SL 34, in a series of trials at centres in Bugisu and Western Province.

AGRONOMY

175. Results from the ground treatment trials at Kituza and Namalere show that plots cultivated either by hand or by machine, yield considerably better than plots with a weed cover periodically slashed or with a sweet potato cover.

176. Profitable yield responses have been obtained from the use of nitrogenous fertilizers on arabica coffee at three experimental sites and the first yield response to magnesium fertilizers was obtained this year on Arabica coffee at Bugusege. In the extension trials on farmers' Robusta coffee there were quite marked responses in leafiness and greenness of the foliage to nitrogenous fertilizers; yields however, have not shown these fertilizers to be economically profitable.

177. Investigations on methods of leaf sampling of coffee trees have indicated that the optimum sampling time is at the period of main flowering. Satisfactory correlations have been found between leaf nitrogen content and (a) yield of coffee and (b) yield response to a given dressing of nitrogenous fertilizer. These findings indicate that leaf analysis may have considerable value in advisory work on fertilizer use.

PATHOLOGY

178. The pathogen responsible for the "new" disease of Robusta coffee remains unidentified. Histological examinations suggest that there may also be an alga associated with the condition, but efforts at isolating this organism have so far been unsuccessful. In the first year of trials of protectant fungicides, this disease has been successfully controlled. High volume applications of cuprous oxide at 0.5 per cent copper in March, April, June and August gave an absolute control. The mean figures (number of infected trees) from four trials show that the control at 0.1 per cent, 0.25 per cent and 0.5 per cent copper has been 66.8 per cent, 91.6 per cent and 99.2 per cent respectively of the possible infection. At 0.1 per cent copper, no difference in efficiency was apparent between cuprous oxide and copper oxychloride. "Captan" fungicide failed to reduce infection.

179. Comparison of juvenile and mature leaves of Arabica coffee in their reaction to uniform unit-area inoculation with *Hemileia vastatrix* showed marked susceptibility of the younger tissues. This condition is however lost in the maturity stage between two adjacent nodes. In addition, the pathogen has a shorter incubation period in the younger tissues.

180. Application of copper at 250 ppm as copper sulphate gave an eradicant action 24 hours following infection with *Hemileia* rust. Seedlings of SL 28 withstood 100 ppm of copper without severe phytotoxic symptoms.

ENTOMOLOGY

181. Counts of *antestia* adults and *nymphs* have been made every three weeks since 10th May on ten varieties of Arabica in three blocks of the Kawanda variety trial. There is no evidence that *antestia* distribution or numbers are significantly influenced by variety, tree size or yield except in respect of Bugisu Local, which in this trial comprises exceptionally small low yielding trees devoid of bugs. The *antestia* population declined significantly after June until after harvesting in September and remained low until the end of the year.

182. Experimental spraying has been carried out with a 0.2 per cent suspension of saturn yellow fluorescent pigment. Results are summarised in Tables H and I, which show the percentages of sample leaves with satisfactory cover on their under surfaces. Upper leaf surfaces have been found to be significantly better covered than lower. The latter, being entomologically more important, have been taken as the indicators of good or bad cover.

TABLE H

Type of tree					Unpruned		Pruned	
Application rate/acre	..	..	..	..	15 gal.	30 gal.	15 gal.	24 gal.
Percentage satisfactory leaves ex top	..	..	..	..	32.1	43.3	64.7	78.4
Percentage satisfactory leaves ex middle and bottom	..	..	..	..	64.0	82.3	65.2	68.6

183. Fifteen gal./acre is the standard rate of application with a Motoblo using the 2.2 mm restrictor and spraying from one side of the tree only. The 30 gal. rate is achieved by spraying trees from both sides. Two-sided application in pruned coffee would be wasteful; the 24 gal. rate was achieved by making the operator sweep the trees from top to bottom to top instead of from bottom to top to bottom.

TABLE I

Restrictor	..	..	2.2 mm.	2.2 mm.	3.0 mm.
Application rate/acre	..	..	15 gal.	30 gal.	30 gal.
Percentage leaves satisfactory	..	..	48.1	71.0	39.8

184. The application with the 3.0 mm jet was from one side of the trees only, the 2.2 mm application rates were single and double-sided respectively.

185. Three points stand out as being essential to satisfactory spraying: good pruning, application rates of at least 24 gal./acre and the use of the 2.2 mm restrictor in the machine.

186. A trial of Aldrin and Dieldrin ground dusting treatments was laid down in Bugisu against berry borer, *Stephanoderes*. Results to date show that a small but positive control of berry borer has been achieved, Aldrin being, overall, slightly better than Dieldrin.

PHYSIOLOGY

187. The measurement of growth and cropping of Robusta coffee has been the subject of intensive investigation. It has been shown that the diameter at the base of a stem bears a relation to the sum total weight of stem, laterals, leaves and crop. The growth of the stem can therefore be assessed by the increase in size of the stem diameter. Furthermore, since each stem of a tree appears to be a cone similar to any other of the same tree, it may be possible to measure growth of the whole tree by assessing the increase in diameter of a single stem.

188. In perennial crop experiments lasting several years, the major interest lies in the total crop produced over a given period but the fluctuation in the individual year to year crop is of economic interest. A study of past records indicates that the cumulative crop totals when plotted against time, are of linear form. Thus the total crop and the fluctuation in the cropping can be compared by measuring the slope of, and deviations from, the line.

189. Investigations have been undertaken using leaf discs, to ascertain the factors influencing the uptake of water by coffee tissue. This was then extended to a study of the distribution of water content in a mature Robusta tree and a sampling procedure was evolved whereby the water status of the tree may be assessed.

190. The influence of varying water regimes on the growth of Arabica and Robusta coffee seedlings has been studied. There are indications that there is a tolerance or resistance to drought in some varieties which affects growth and can be detected by sampling leaf discs periodically.

191. The depth of rooting of Robusta coffee at Kituza has been found to be between seven and eight feet. These findings will be important in more detailed studies of the moisture relations of coffee.

192. Coffee yields over a period of thirteen years at Kawanda have been found to be related to the logarithm of the sum of the rainfall during the December, January and February coinciding with the flowering and setting of the crop. Further work along these lines is in progress to determine the value of rainfall in predicting coffee production on a countrywide basis.

PROCESSING

193. Robusta coffee beans, artificially contaminated with mould spores and stored at under 12 per cent moisture content, remained free from mustiness for nine months. At 14 per cent moisture content, deterioration commenced after 10 weeks. Coffee of 16 per cent moisture content became musty after five weeks.

194. Following the discovery that mustiness was caused by the development of moulds in the surface layers of coffee beans following contamination by spores released from *kiboko* (dried cherry) husk, recommendations were made to mill owners to reduce this risk. Changes have been made in mill designs to reduce the amount of dust in the factory. A machine designed to free *kiboko* from mould spores before hulling is under test.

195. It has been suggested that a possible method whereby coffee buying stores could check the dryness of dried cherry was to do a weight per volume check. Experiments showed, however, that with decreasing moisture content, cherry progressively shrinks. At a constant volume, the number of coffee cherries increased in inverse proportion to decreasing moisture content, and there was little difference in the weight of a given volume of cherry at 16.4 per cent and at 14.1 per cent moisture content.

196. Caustic soda was successfully used to remove mucilage from pulped beans. Quality was not affected.

197. Further trials have been conducted on artificial drying of coffee. Fresh cherry was dried down to 12 per cent moisture content in 50 hours continuous drying without loss of quality. Freshly pulped beans were successfully dried in 30 hours continuous drying. Intermittent drying of cherry gave poor results.

(ii) *Cocoa*

BREEDING

198. Trials have been planted at eleven sites in potential cocoa-growing areas to compare the performance of 11 Upper Amazon hybrids and open pollinated seedlings from the Upper Amazon plot at Kituza. Seed gardens of T63 and T85 have been established at Kituza and Namyoya, and a mixed plot of Upper Amazon hybrids at Mukono.

AGRONOMY

199. The shade trial at Kituza to assess growth rates and suitability of various shade trees for cocoa has shown that some shade trees have a definite deleterious effect e.g. *Desmodium distortum* and *Cajanus cajan*. After two seasons' growth, cocoa under *Grevillea robusta* and under bananas is making the most rapid growth. In general, shade trees should be planted at least one year before the cocoa seedlings. A wind-break to maintain relatively constant high air humidity around young cocoa trees appears to be beneficial. For this purpose, *Tephrosia candida* and *T. vogelli* every third or fourth interline in a north-south direction, with *Crotalaria juncea* in the other interlines, appear to be the most effective.

PROCESSING

200. Three small batches have been processed in a solar fermentary. This type of fermentary, modified to give greater insulation, will be adequate for small lots, fermentation being completed in four to five days. It is anticipated that the main difficulty will be to dry adequately in wet weather.

(i) Pasture Agronomy

201. New varieties of grass and pasture legumes are being imported and are under test. Meanwhile, assistance has been given to extension staff in the establishment of leys of known superior grasses and legumes. In 1961, seed was issued from Serere to plant up more than 520 acres of ley at 67 sites, and the purchase of some 26,000 lb. of grass seed in the Serere area has led to the development of a keen interest by local farmers in grass seed as an agricultural product. It is unfortunate that the quality of seed is generally low and investigations are continuing on ways by which this quality can be improved.



PLATE I. Dressing of Cotton Seed for the control of blackarm.



PLATE II. A Coffee Farmer tries his hand with a small tractor.



PLATE III. Irrigation—Pilot Farm, Mubuku, Toro.



PLATE IV. Arabica Coffee Spraying—Western Region.



PLATE V. Agricultural Shield Competition—Singo—the Director inspects the Grade of BP.52 cotton.



PLATE VI. Agricultural Shield Competition—Singo—New bunds in the winning gombolola.



PLATE VII. Picking of Vanilla—Buganda.

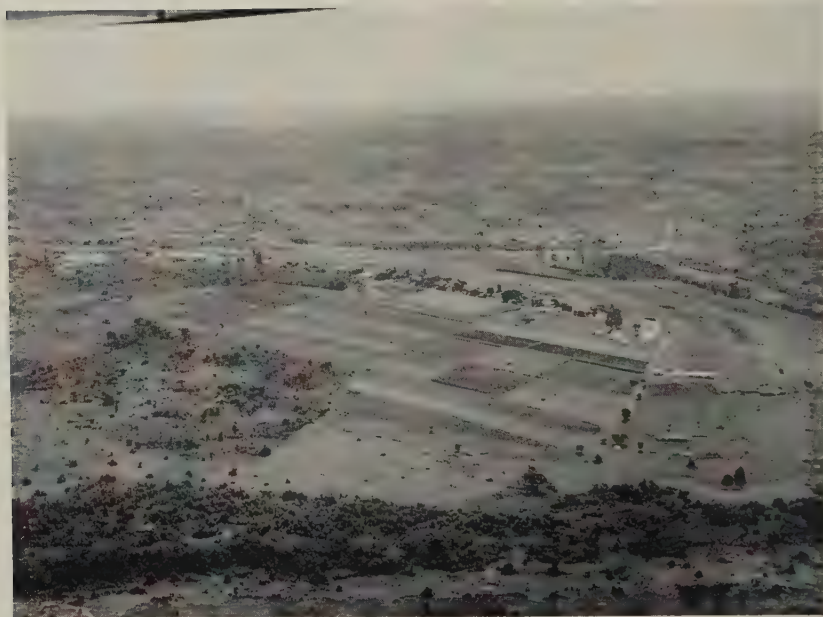


PLATE VIII. Kawanda Research Station, nine miles from Kampala, the capital.

202. In 1961, for the first time, test crops were planted in fields which had been planted with either pure grass or with grass/legume mixture and which had been grazed throughout the preceding three years. Unfortunately, owing to unfavourable weather, cotton yields were low and it is, therefore, not sound to place too much reliance on the results obtained.

203. However, from these trials, and from a grass/legume trial to which fertilizers were applied and reaped by cutting, there is an indication that treatments which give the highest yields, either in liveweight gain or in the yield of green material during the ley period, tend to produce lower yields in the following cotton crop; phosphatic and sulphur-containing fertilizers have been shown to be extremely important. These two nutrients markedly affect both the yield of the legume in the pasture and also the yield of the following cotton. Analyses of leaves from the cotton have shown that cotton grown on plots which had previously contained the legume, *Stylosanthes*, had enhanced nitrogen content. However, it must be reported that the cotton following the pastures containing legume was lower yielding; this is believed to have been due to the extra nitrogen retarding the maturity of the crop in a season in which weather conditions were very unfavourable to a late crop.

204. Further investigations need to be carried out on the interaction of the legumes in the pasture and added inorganic fertilizer. It is clear from work in many other parts of the world that this interaction is important and it may prove to be a most important factor in determining the influence of mixed leys on soil fertility.

205. Pasture and legumes already partially evaluated in cutting trials have been studied further in large grazing trials which now occupy a total of some 55 acres. In one trial over a continuous 634 day period, heifers put on an average of 250 lb. liveweight per acre per annum. This is an average of 0.69 lb. per acre per day. It is believed that production per acre can be increased even further by increasing the stocking rate and by the use of inorganic fertilizers and a new trial to study this has been started. Pastures containing legumes have proved to be better in producing liveweight gains. The best example of this is an experiment at Ngetta where, in 1961, a pasture of *Chloris* and *Stylosanthes* gave a liveweight gain of 404 lb. while a *Chloris* pasture gave only 193 lb. It is also apparent that the legume becomes increasingly important in the later years of the ley. This is particularly the case with Guinea grass which does not grow well on the poorer soils at Serere; the introduction of a legume into the pasture has been shown to increase the liveweight gain by more than 20 per cent in the second year of grazing.

206. Although elephant grass is out of its environment at Serere when newly established it nevertheless produces more herbage (measured by number of days of grazing) than a comparable area of short grass, although there is no measurable difference in milk production from the two types of pasture. As the pastures get older the difference in productivity appears to diminish.

207. In 1960, at Kawanda, observational trials comparing 10 fertilizer treatments on grazed elephant grass indicated that sulphate of ammonia and superphosphate were beneficial but supplementary potash and magnesium fertilizers were ineffective. In 1961, the second year of this trial, results seemed more

variable and, although responses were still obtained with sulphate of ammonia, the superphosphate gave no additional benefit. In both years the residual effect of sulphate of ammonia on the succeeding crop was small. These observational trials suggest that 2 cwt. sulphate of ammonia per acre to alternate crops of elephant grass may be somewhere near the optimum and a statistical experiment has now been laid down.

208. The decline in yield in grazed elephant grass at Kawanda has been marked in the second and third years after establishment. Springtime cultivation by tractor, which has now replaced ox-cultivation, appears to improve water penetration and the general appearance of the grass. In spite of the heavy rain, elephant grass pastures have given the appearance of some water shortage and sheet erosion has been considerable. It is considered that this is due to panning and surface compaction caused by shallow ox-cultivation and subsequent heavy grazing both conditions presumably being ameliorated by springtime cultivation.

209. A "stunting" disease of elephant grass has appeared in the pastures and the variety collection at Kawanda. It has not yet been established what is responsible for this disorder but the possibility that it may be due to a virus is being investigated at Muguga by the staff of the East African Agriculture and Forestry Research Organisation.

(j) Livestock

210. During the year the aim has been to build up the numbers of cattle at Serere to enable breeding and selection within the local type of Zebu to be accelerated. The clearing of new land has enabled adequate pasturage to be established to receive the increased numbers. Culling standards have been reduced slightly and a larger proportion of heifers has been retained. Thus at the end of the year a herd of more than 500 head was present on the station. Weather conditions throughout the year were unfavourable and production was influenced by an outbreak of army-worm and by foot-and-mouth disease. Nevertheless, the average milk production from 56 completed lactations of 1,234 lb., on the basis of once-a-day milking, is only slightly below the high figure obtained in 1960. Liveweight gains also were either equal to or below average until the end of the year when very high figures were obtained when the weather became warmer and grass was plentiful. The average daily liveweight gain by calves during the year of 0.77 lb. is the highest ever recorded at Serere. It should be emphasised that no supplementary feeding is practised, and the herd is managed at a level which is quite within the reach of any progressive farmer.

211. The experiment with Boran cattle imported from Kenya has been continued and new importations have brought the herd number closer to the total of 100 which is desired. The intention is to determine whether this breed can maintain a higher rate of productivity than local cattle in the local environment and especially in the presence of disease challenge. New arrivals at Serere are treated with a drug to give them protection against undesirable side effect which might arise when they develop east coast fever and other tick-borne diseases, but thereafter they are managed in the same way as the other stock on the farm. Although the Boran have thus had to contend with quite severe attacks of disease they have nevertheless had growth rates which are up to 50 per cent more than the local stock from birth and about 25 per cent greater than the local stock since

the date of the Borans' arrival at Serere. Calves which have been born from the earliest importations have been treated in the same way as their Teso contemporaries and have not received any special disease protection. Numbers so far are inadequate to enable any conclusions to be drawn concerning disease resistance and performance of the breed when reared from birth at Serere. It would appear, however, that a 50 per cent survival is likely, which is very much higher than expected, and growth rates are at least as good as Teso Zebu calves. It has already been found that some of the Boran cows are poor milk producers in their first lactation. This is probably important in its effect on the growth of their calves under the system at Serere where milking once-a-day is practised. Under fully ranged conditions at Serere, where the calf is able to take all the dam's milk, liveweight gains of over 1 lb. a day have been recorded for Boran calves. During 1962 a very much clearer picture of the production potential of the Boran will be obtained. This will enable a decision to be reached as to whether more rapid advance will be achieved by concentrating on this breed rather than by pursuing the longer-term project involving the selection of high producing animals within the local stock.

212. During the last year the work has been hampered to a considerable extent by an outbreak of *Brucellosis*. Part of the herd has had to be segregated and all animals have now been vaccinated with a Strain 19 *B. abortus* vaccine. This treatment may not solve the problem since the disease is suspected to be due to *B. melatensis* rather than *B. abortus*.

213. At Kawanda 32 cross-bred Jersey-Nganda calves had been born by the end of the year; there were no deaths but two abortions occurred. It is anticipated that the Kawanda commitment of 70 calves will have been fulfilled by mid-1962.

214. The necessity to retain female stock to provide calves for the cross-breeding scheme resulted in excessively large numbers of cattle, more than the station could adequately maintain. Grazing was badly strained for a large part of the year, an overall average of $1\frac{1}{2}$ beasts per acre of all available grazing being carried. Sales of Nganda stocks towards the end of the year eased the situation considerably. The heavy stocking rate caused the Nganda herd to lose condition, particularly during the latter half of the year. Dry cows and cows in milk had the best of the grazing and average milk yields were maintained.

VII. STAFF

215. The staff position improved considerably and at the end of the year all senior posts with the exception of that of Specialist Tobacco Officer had been filled. Twelve Assistant Agricultural Officers were absent from the Protectorate taking university degree courses with a view to qualifying as Agricultural Officers or specialist officers. The first diplomates from Bukalasa Farm Institute will join the Department in 1962. The number of men entering Bukalasa and Arapai Farm Institutes with a view to qualifying for appointment as Agricultural Assistants remained well below the capacity of both Institutes and the shortage of this category of staff in the Department remained acute, whilst the number of Assistant Agricultural Officers was well below the approved establishment of one per county.

216. During the year, the Department lost through retirement the services of Mr. A. E. B. Williams, Senior Agricultural Officer, who had been with the Department since 1946 when he was transferred from Nigeria.

217. The vacant post of Chief Research Officer was filled by the transfer of Mr. W. V. Rose from Western Nigeria.

218. Promotions included: Mr. G. L. Kigundu, M.B.E., to Assistant Director of Agriculture (Field), Mr. H. R. Berunga, M.B.E., to Senior Agricultural Officer, Mr. D. G. Thomas to Senior Research Officer.

219. Officers seconded to African local governments included Mr. H. W. Muloki, who is Kyabazinga of Busoga; Mr. Z. H. Kwebiha, Katikiro of Bunyoro; Mr. J. G. Wanyoto, Secretary-General, Bugisu; Mr. W. O. Lutara, Secretary-General, Acholi; and Mr. R. K. Kachope, Secretary for Agriculture, Acholi.

220. Mr. H. W. Muloki, Assistant Agricultural Officer, was honoured by the award of the O.B.E. in the 1961 Birthday Honours List.

VIII. ACKNOWLEDGMENTS

221. It gives me great pleasure once again to acknowledge the help and co-operation which this Department has received from both official and unofficial bodies, and from other departments in Government.

ENTEBBE,

4TH APRIL, 1962.

E. WILLIAMS,
Director of Agriculture.

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SIAMMA RAINFALL: 1961

STATION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
AMT Met Mile 3°04N; 35°03E.	0.26 2	0.16 2	2.46 3	1.00 6	2.64 7	7.53 14	7.53 14	14.74 28	6.93 10	10.57 20	11.72 22	0.21 0	66.24 1282
Mean Ine.	0.71	1.20	3.82	5.30	5.65	3.35	5.75	9.48	7.69	8.10	5.05	1.50	59.54
AMT Met Mile 3°04N; 35°03E.	0.06 2	0.07 2	4.77 9	2.96 6	3.37 7	9.07 17	9.14 17	12.44 24	6.82 10	11.82 23	9.06 17	2.48 5	74.57 1399
Mean Ine.	0.48	1.72	3.48	6.82	7.76	5.71	6.86	9.16	6.94	6.91	3.80	1.62	60.66
LIKA (Vegete) 2°17N; 35°03E.	0.00 1	0.00 1	3.47 7	5.83 11	5.81 11	7.51 14	12.30 24	8.07 16	6.41 10	6.57 12	6.41 10	4.61 9	66.87 1280
Mean Ine.	1.13	1.38	3.45	6.71	7.42	5.08	6.15	8.94	6.47	6.83	3.16	1.69	56.06
MCRTO 2°17N; 35°03E.	0.00 1	0.00 1	1.88 4	7.38 14	7.38 14	13.10 25	7.77 15	10.7 20	1.99	2.66	10.76	3.57	55.32
Mean Ine.	0.33	1.21	2.91	4.85	5.30	3.54	5.88	4.21	1.99	1.90	1.86	1.00	112
SHREKE 1°53N; 34°11E.	0.21 2	0.72 14	5.34 10	5.34 10	5.72 11	6.99 13	10.48 20	8.16 16	5.70	5.70	9.57	6.29	71.76
Mean Ine.	0.66	2.14	3.76	6.15	7.56	4.15	4.60	6.59	4.46	4.46	5.74	2.18	53.80
MUALE 1°53N; 34°11E.	0.00 1	0.00 1	2.80 6	5.89 11	5.89 11	3.64 7	6.49 12	9.69 18	8.21	7.48	6.84	4.34	66.37
Mean Ine.	1.03	1.99	3.68	6.36	6.86	4.63	4.87	5.41	4.26	3.30	2.44	1.67	46.03
TURICO 0°42N; 34°10E.	0.71 5	3.20 12	4.73 9	11.04 20	8.75 16	4.53 8	5.01 9	6.95 13	5.90	5.39	1.39	9.42	78.03
Mean Ine.	2.04	2.71	5.43	6.79	6.49	4.08	3.93	4.62	4.08	4.69	3.99	3.09	55.54
JINJA 0°28N; 33°11E.	0.72 3	2.53 11	7.14 17	5.63 12	3.95 8	1.30 3	2.63 5	4.47 9	3.68	14.51	16.99	4.73	68.97
Mean Ine.	3.25	2.32	4.70	7.49	4.37	1.86	2.44	3.59	3.44	4.02	5.97	3.35	48.72
KABALE 1°15N; 29°59E.	2.25 11	4.40 16	3.90 17	2.39 19	2.13 16	0.13 3	0.00 0	2.91 6	3.34	4.62	7.93	6.03	39.49
Mean Ine.	2.38	3.59	4.56	5.34	3.65	1.01	0.79	2.14	3.69	3.82	4.20	3.60	38.76
MUARE 0°37S; 30°59E.	1.38 7	3.49 16	5.12 14	5.45 14	3.14 12	0.14 3	0.30 0	0.71 1	3.50	4.62	10.01	6.95	45.21
Mean Ine.	1.65	2.46	3.63	4.78	3.17	0.97	0.84	2.42	3.26	4.17	4.50	3.00	35.53
BIET FORTAL 0°40N; 30°17E.	2.23 5	3.21 17	3.93 17	8.31 16	9.11 17	3.67 8	5.41 10	5.34 9	5.34	9.87	10.00	6.06	76.99
Mean Ine.	1.35	2.87	5.26	7.33	5.67	3.22	2.33	4.59	7.44	6.46	6.49	3.06	59.68
BULINDI 1°24N; 31°28E.	0.08 1	2.41 10	3.33 7	6.81 13	3.73 8	5.76 11	4.39 9	6.86 12	6.44	9.85	16.90	3.25	69.80
Mean Ine.	1.34	2.36	4.08	6.50	5.19	3.50	3.53	6.15	6.65	5.07	4.50	2.82	51.80
KABALA 0°26S; 31°44E.	0.47 2	3.29 14	5.12 10	7.22 14	0.81 2	1.66 3	3.28 6	1.42 3	3.77	7.90	9.94	2.89	47.77
Mean Ine.	2.43	2.40	4.49	7.05	6.56	1.80	1.41	2.58	3.42	3.95	3.51	1.50	42.50
KAKUMIRO 0°46N; 31°03E.	0.60 4	2.80 14	4.83 10	9.10 18	2.66 5	0.70 1	0.38 0	4.58 9	12.34	12.34	12.13	4.68	63.81
Mean Ine.	1.34	2.27	4.38	6.81	4.17	2.60	2.92	4.18	4.49	7.19	5.07	2.75	51.55
SINDA 0°55S; 32°01S.	0.60 4	3.33 14	5.01 10	6.36 12	5.26 9	1.26 3	5.43 10	3.83 8	8.83	7.87	11.43	3.65	61.76
Mean Ine.	1.90	2.60	4.54	6.03	4.06	2.13	1.94	4.18	4.93	5.64	4.71	3.07	46.49
KAMPALA 0°13N; 32°03E.	0.30 2	1.62 8	9.01 16	7.27 17	1.00 5	0.69 1	1.90 4	6.77 13	12.77	12.77	9.93	4.52	64.41
Mean Ine.	2.28	2.14	4.16	6.35	5.67	2.41	2.26	4.32	3.92	4.27	4.89	3.33	46.21
ENT-ABE 0°03N; 32°27E.	1.79 5	3.37 10	7.43 14	9.95 20	6.65 12	2.65 6	3.02 6	4.07 9	5.52	10.43	15.14	8.26	79.51
Mean Ine.	3.96	5.44	6.48	11.24	10.02	3.99	2.60	3.40	3.48	5.90	5.91	5.08	65.44

COTTON PRODUCTION : 1960/61 SEASON

	ACREAGES*			SALES IN TONS (Seed Cotton)		YIELD PER ACRE (Seed Cotton)		PRODUCTION (bale of lint)		
	Total 1960/61	Mean 1955/56- 1959/60	Total 1960/61	Mean 1955/56- 1959/60	Total 1960/61	Mean 1955/56- 1959/60	Total 1960/61	Mean 1955/56- 1959/60	Total 1960/61	Mean 1955/56- 1959/60
BUNDA						1b.		1b.		
Mengo	175,000	255,000	50,957	45,877	395	395	53,558	395	53,558	77,267
Masaka	19,000	34,000	1,468	3,804	175	254	2,435	254	2,435	6,515
Mubende	55,000	85,000	8,729	10,741	350	379	15,032	379	15,032	15,174
TOTALS	250,000	355,000	41,154	50,422	359	382	71,025	382	71,025	101,955
WESTERN										
Bunyoro	55,000	45,000	5,232	5,250	245	275	10,541	275	10,541	9,830
Toro	35,000	35,000	5,722	4,454	237	311	6,653	311	6,653	7,784
TOTALS	85,000	75,000	10,954	9,714	283	291	17,324	291	17,324	15,514
EASTERN										
Bugoga	322,000	375,000	59,098	57,732	339	345	104,318	345	104,318	98,574
Busoga	252,000	345,000	31,532	32,555	250	213	54,219	213	54,219	54,550
South Teso	64,000	61,000	5,075	5,654	178	210	8,597	210	8,597	7,899
South Teso Segregated	35,000	35,000	5,725	4,599	301	175	6,799	175	6,799	6,081
North Teso	51,000	65,000	5,121	4,711	272	219	8,515	219	8,515	2,909
Uguku	15,000	15,000	1,557	1,711	272	219	8,515	219	8,515	2,909
TOTALS	799,000+	894,000	106,059†	107,185	237	269	184,577	269	184,577	181,942
NORTHERN										
Lango	175,000	180,000	26,074	18,243	331	227	44,041	227	44,041	31,215
Luhya	59,000	57,000	9,559	6,502	319	268	15,268	268	15,268	11,744
West Acholi	61,000	49,000	8,334	6,568	328	302	14,540	302	14,540	11,279
West Nile	75,000	60,000	15,989	8,772	356	329	23,103	329	23,103	14,599
TOTALS	381,000+	345,000	57,556†	40,484	335	264	98,035	264	98,035	69,138
PROTECTORATE TOTALS:-	1,415,000	1,670,000	214,953	217,505	315	393	571,023	393	571,023	369,650

* Corrected to '000 acres.

+ These figures do not agree with provincial totals as shown in Appendices III (a), III (c) and III (d) and are based on the fact that the boundaries of the zones listed under Eastern and Northern Provinces do not coincide with provincial boundaries. The differences are compensating and the Protectorate totals in Tables II (a) and III (a) agree.

† Similarly these figures do not agree with those in Appendix IV (a); the Protectorate totals, however, agree.

COTTON PRODUCTION : 1961/62 SEASON

Monthly Plantings - Acres

Province and Zone	April	May	June	July	August	September	Total
BUGANDA							
Mengo	-	25,856	119,862	116,744	44,792	8,654	315,828
Maseka	-	3,561	7,548	15,371	18,434	4,023	48,967
Mubende	-	2,879	29,748	46,031	15,739	395	94,886
TOTAL	-	31,286	156,872	178,146	78,965	13,072	458,881
WESTERN							
Bunyoro	-	1,780	10,265	34,415	14,354	874	61,688
Toro	-	-	3	4,416	13,853	6,303	24,566
TOTAL	-	1,780	10,268	38,831	28,187	7,177	86,243
EASTERN							
Busoga	1,520	70,094	148,603	145,821	96,894	-	452,432
Mbale	5,951	60,137	106,183	106,881	76,919	-	396,071
South Teso	7,141	32,284	19,104	25,166	8,483	-	92,158
South Teso Segregated	1,675	11,987	14,598	13,670	5,496	-	47,526
North Teso	2,117	17,436	23,975	26,236	6,804	-	76,558
Usuku	1,654	8,585	2,751	3,485	57	-	16,542
TOTAL	20,068	270,503	315,314	321,249	194,153	-	1,051,287 *
NORTHERN							
Lango	1,707	23,251	68,200	60,967	29,249	524	223,898
East Acholi	281	15,299	32,450	33,746	13,603	792	96,321
West Acholi	-	4,997	19,961	23,484	8,141	530	56,413
West Nile	-	701	26,228	46,008	21,831	4,810	99,078
TOTAL	1,988	43,748	165,839	184,205	72,324	6,656	475,710 *
PROTECTORATE TOTALS	22,056	277,857	649,293	722,431	373,629	26,905	2,072,121

* These figures do not agree with those in Appendices III (a), III (c) and III (e) due to the fact that the boundaries of the zones listed under Eastern and Northern Provinces do not coincide with the provincial boundaries. The differences are compensating; the Protectorate totals agree.

Appendix II (c)

COTTON : MONTHLY PLANTINGS AS PERCENTAGES OF TOTAL

Province and Zone	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
	1961/62	Mean 1956/57- 1960/61	1961/62	Mean 1956/57- 1960/61	1961/62	Mean 1956/57- 1960/61	1961/62	Mean 1956/57- 1960/61	1961/62	Mean 1956/57- 1960/61	1961/62	Mean 1956/57- 1960/61
BUGANDA												
Mengo	-	-	8.2	1.4	37.9	26.9	37.0	41.7	14.2	27.1	2.7	2.9
Masaka	-	-	7.3	10.8	15.4	27.1	31.4	20.6	37.7	25.5	8.2	16.0
Mubende	-	-	2.5	2.5	31.6	16.8	48.8	36.3	16.7	40.0	0.4	4.4
TOTAL	-	-	6.9	2.5	34.2	24.9	35.8	38.7	17.2	29.5	2.9	4.4
WESTERN												
Bunyoro	-	-	2.9	4.0	16.6	17.5	55.8	46.2	23.2	23.3	1.4	-
Toro	-	-	-	-	-	0.2	18.0	6.5	56.3	66.3	25.7	27.0
TOTAL	-	-	2.1	2.4	11.9	10.4	45.0	29.9	32.7	46.2	8.3	11.1
EASTERN												
Busoga	0.3	0.7	15.2	23.7	32.1	31.2	31.5	31.4	20.9	12.4	-	0.6
Mbale	1.7	2.0	16.9	16.7	29.8	31.4	21.6	33.0	30.0	16.1	-	0.8
South Teso	7.8	9.9	36.0	43.5	20.7	24.5	27.3	16.6	9.2	5.5	-	-
South Teso Segregated	8.5	1.2	25.2	34.8	30.9	30.6	28.8	21.7	11.6	8.1	-	-
North Teso	2.8	3.3	22.6	33.6	31.3	34.0	34.2	23.8	8.9	5.3	-	-
Usuku	10.1	9.0	61.9	58.4	16.6	27.6	21.1	5.8	0.3	0.2	-	-
TOTAL	1.9	2.3	19.1	24.4	30.0	30.9	30.5	29.5	18.5	12.4	-	0.5
NORTHERN												
Lango	0.8	0.9	10.4	12.5	39.4	38.5	36.2	34.9	13.0	13.0	0.2	0.2
East Acholi	0.3	0.9	16.1	15.7	33.7	35.6	35.0	33.4	14.1	14.4	0.8	-
West Acholi	-	0.1	7.6	6.8	35.4	39.0	41.6	40.3	14.4	13.3	1.0	0.5
West Nile	-	-	0.7	2.0	26.5	24.1	46.4	46.2	21.5	26.1	4.9	1.6
TOTAL	0.4	0.6	9.2	10.4	35.1	35.6	38.7	37.4	15.2	15.5	1.4	0.5
PROTECTORATE TOTAL	1.1	1.4	13.4	15.9	31.3	29.7	34.9	33.1	18.0	18.1	1.3	1.8

COTTON PRODUCTIONNumber of Bales of 400 lb., 1907-1961

(Note:- All figures are corrected to 1,000 bales)

Season	Bales (Actual)	Bales (5-year average)
1907 ..	2,000	-
1908 ..	4,000	-
1909 ..	5,000	9,000
1910 ..	12,000	13,000
1911 ..	20,000	21,000
1912/13	26,000	25,000
1913/14	40,000	27,000
1914/15	26,000	28,000
1915/16	22,000	29,000
1916/17	28,000	26,000
1917/18	27,000	30,000
1918/19	36,000	44,000
1919/20	47,000	48,000
1920/21	81,000	60,000
1921/22	48,000	78,000
1922/23	88,000	108,000
1923/24	128,000	128,000
1924/25	196,000	145,000
1925/26	180,000	155,000
1926/27	134,000	170,000
1927/28	138,000	156,000
1928/29	204,000	157,000
1929/30	125,000	173,000
1930/31	189,000	204,000
1931/32	207,000	220,000
1932/33	295,000	246,000
1933/34	286,000	271,000
1934/35	253,000	296,000
1935/36	316,000	321,000
1936/37	332,000	325,000
1937/38	418,000	335,000
1938/39	307,000	344,000
1939/40	300,000	326,000
1940/41	365,000	264,000
1941/42	238,000	241,000
1942/43	112,000	236,000
1943/44	191,000	208,000
1944/45	272,000	207,000
1945/46	227,000	218,000
1946/47	231,000	258,000
1947/48	170,000	272,000
1948/49	391,000	295,000
1949/50	339,000	325,000
1950/51	346,000	355,000
1951/52	380,000	357,000
1952/53	320,000	349,000
1953/54	398,000	352,000
1954/55	300,000	351,000
1955/56	364,000	357,000
1956/57	372,000	358,000
1957/58	351,000	370,000
1958/59	401,000	371,000
1959/60	360,000	-
1960/61	370,000	-

CROP PRODUCTION

Estimated Acreages under Crops, 1960 and 1961 - African Cultivation

(Thousand Acres)

CROP	Buganda		Eastern		Northern		Western		Total	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Beans (Mixed & Cow Peas)	144.7	135.4	175.0	226.3	129.8	243.8	128.2	116.4	577.5	721.9
Beans (Soya)	4.8	5.3	-	-	-	-	3	1.3	5.1	6.6
Cassava	94.2	79.3	208.4	297.3	209.5	296.4	93.7	112.8	606.8	784.8
Cocoa	1.6	1.6	24.1	24.4	9	3	8.8	14.3	36.4	40.6
Coffee (Arabica)	475.8	615.3	7.8	7.3	2	1	14.7	15.2	498.5	537.9
Coffee (Robusta)	250.2	458.9	825.2	1,084.3	355.1	445.8	85.8	86.3	1,616.2	2,072.1
Cotton	6.6	2.4	4.5	4.0	4.4	-	1	-	5.6	6.4
Groundnuts	82.5	88.2	230.2	84.1	84.1	112.6	30.9	35.2	487.7	556.0
Maize	93.3	155.3	136.6	153.3	56.0	66.9	63.3	65.5	349.3	441.0
Millet (Sorghum)	41.0	60.9	166.9	159.1	262.3	314.8	208.1	185.4	678.3	720.2
Millet (Finger)	21.2	24.1	743.1	769.1	296.6	362.0	100.9	126.8	1,161.8	1,288.0
Millet (Bulrush)	-	-	2	2	5.8	-	-	-	6.0	2
Onions	-	-	-	-	-	-	3.3	3.3	3.3	3.2
Peas (Pigeon)	-	-	1	1	180.6	138.4	3.4	1.5	181.1	140.0
Peas (Field)	-	-	-	-	-	-	30.6	41.9	30.6	41.9
Plantains	555.4	502.1	430.7	435.6	5.4	6.6	554.4	578.8	1,545.9	1,521.1
Potatoes (Sweet)	152.3	124.0	178.5	255.8	68.8	123.6	179.1	201.5	598.7	704.9
Potatoes (Solanum)	-	-	5	3	-	-	10.8	12.1	11.3	12.4
Rice	-	-	1.6	1.7	1.2	2.3	1.6	2.5	4.4	6.5
Simsim	6.3	6.8	18.0	19.6	216.4	239.2	2.8	3.8	243.6	269.4
Tobacco (Air-cured)	-	-	-	-	1.2	1.0	1.9	3.2	3.1	2.2
Tobacco (Fire-cured)	2	3	-	-	-	-	6.0	3.2	6.2	3.5
Tobacco (Flue-cured)	-	-	-	-	2.1	2.7	5	5	2.6	3.3
TOTAL	1,959.0	2,160.0	3,151.3	3,755.4	1,896.4	2,352.5	1,595.1	1,609.5	8,497.2	9,878.2

* Under fifty acres.

(All figures to nearest 100 acres)

CROP PRODUCTIONEstimated Acreages under Crops, 1960 and 1961 - African CultivationBUGANDA PROVINCE

(Thousand Acres)

CROP	Mengo		Masaka		Mubende		Total	
	1960	1961	1960	1961	1960	1961	1960	1961
Beans (Mixed)	96.5	87.4	33.2	33.6	15.0	14.4	144.7	135.4
Beans (Soya)	4.0	.6	.8	4.7	-	-	4.8	5.3
Cassava	74.8	60.0	15.0	11.8	4.5	7.5	94.2	79.3
Cocoa	.1	.1	*	*	*	*	.1	.1
Coffee (Arabica)	.6	.6	1.0	1.0	-	-	1.6	1.6
Coffee (Robusta)	345.7	365.3	113.9	134.2	16.2	15.8	475.8	515.3
Cotton	209.5	388.2	18.7	49.0	22.0	21.7	250.2	458.9
Grams	.2	.1	.3	1.1	.1	1.2	.6	2.4
Groundnuts	46.6	57.4	24.3	17.7	11.5	13.1	82.5	88.2
Maize	56.0	110.6	31.6	37.5	5.7	7.2	93.3	155.3
Millet (Sorghum)	25.5	34.2	15.1	21.4	.4	5.3	41.0	60.9
Millet (Finger)	18.4	18.2	1.8	1.9	7.0	4.0	21.2	24.1
Plantains	334.6	334.8	201.7	141.5	19.1	25.8	555.4	502.1
Potatoes (Sweet)	123.9	90.9	14.6	18.0	13.8	15.1	152.3	124.0
Simsim	4.9	6.1	.1	-	1.4	.7	6.3	6.8
Tobacco (Fire-cured)	-	-	-	-	.2	.3	.2	.3
TOTALS	1,335.4	1,554.5	472.0	473.4	116.7	132.1	1,924.0	2,160.0

* Under fifty acres.

(All figures corrected to nearest 100 acres)

CROP PRODUCTION

Estimated Acreages under Crops, 1960 and 1961 - African Cultivation

EASTERN PROVINCE

(Thousand Acres)

CROP	Busoga		Bukedi		Bugisu		Teso		Total	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Beans (Mixed & Cowpeas)	35.1	37.4	13.6	43.4	26.2	33.3	100.2	112.2	175.0	226.3
Cassava	47.7	56.6	80.8	100.9	12.5	23.0	67.3	116.8	208.4	297.3
Cocoa	*	*	-	-	-	-	-	-	-	-
Coffee (Arabica)	-	-	-	-	24.1	24.4	*	*	24.1	24.4
Coffee (Robusta)	7.8	7.3	-	-	-	-	-	-	7.8	7.8
Cotton	392.1	462.4	152.4	229.8	56.2	58.8	224.4	333.3	825.2	1,084.3
Grams	-	-	-	-	-	-	4.5	4.0	4.5	4.0
Groundnuts	54.3	125.4	55.1	58.1	10.6	13.2	109.2	123.5	230.2	320.0
Maize	45.7	60.5	29.5	24.0	53.9	60.7	7.5	8.1	136.6	153.3
Millet (Sorghum)	2.7	3.1	32.6	23.2	8.8	8.6	122.9	124.2	166.9	159.1
Millet (Finger)	133.9	156.4	188.4	148.0	107.9	84.8	312.9	379.9	743.1	769.1
Millet (Bulrush)	-	-	-	-	-	-	.2	.2	.2	.2
Peas (Pigeon)	-	-	-	-	-	-	.1	.1	.1	.1
Plantains	197.2	197.4	30.0	32.0	200.0	200.0	3.5	4.2	430.7	433.6
Potatoes (Sweet)	74.4	81.2	28.6	43.6	10.1	17.1	65.3	113.9	178.5	255.8
Potatoes (Solanum)	-	-	-	-	.5	.3	-	-	.5	.3
Rice	.4	.3	.9	1.2	*	*	.3	.2	1.6	1.7
Simsim	2.7	3.5	1.2	1.1	*	*	14.1	15.0	18.0	19.6
TOTALS	994.0	1,191.5	614.0	705.3	510.8	524.2	1,032.5	1,335.4	3,151.3	3,756.4

* Under fifty acres

(All figures corrected to nearest 100 acres)

CROP PRODUCTION

Estimated Acreage under Crops, 1960 and 1961 - African Cultivation

WESTERN PROVINCE

(Thousand Acres)

CROP	Ankole		Bunyoro		Kigezi		Toro		Total	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Beans (Mixed & Cowpeas)	19.5	20.7	6.3	10.2	58.8	54.1	43.6	31.4	128.2	116.4
Beans (Soya)	.2	.1	-	-	-	-	.1	1.2	.3	1.3
Cassava	13.5	13.1	36.8	50.6	2.7	3.3	40.7	45.8	93.7	112.8
Coffee (Arabica)	2.8	6.0	-	-	1.5	3.8	4.4	4.5	8.8	14.3
Coffee (Robusta)	7.3	7.4	1.5	1.6	1.1	1.4	4.8	4.8	14.7	15.2
Cotton	-	-	52.8	61.7	-	-	33.0	24.6	86.8	86.3
Grains	-	-	-	-	-	-	.1	-	.1	-
Groundnuts	10.0	10.6	8.1	9.7	5.8	7.0	7.1	7.9	30.9	35.2
Maize	4.9	5.4	7.1	9.6	36.6	27.0	14.8	23.5	63.3	65.5
Millet (Sorghum)	42.4	10.8	.8	3.3	159.9	167.3	5.0	4.0	208.1	185.4
Millet (Finger)	13.3	43.2	16.1	14.8	52.9	50.3	18.6	18.5	100.9	126.8
Onions	.7	.7	.2	.3	.4	.8	2.0	1.4	3.3	3.2
Peas (Field)	4.8	4.6	-	-	25.5	36.8	.3	.5	30.6	41.9
Peas (Pigeon)	*	-	-	1.2	-	-	.4	.3	.4	1.5
Plantains	373.8	386.0	19.7	20.0	75.9	81.8	85.1	91.0	554.4	578.8
Potatoes (Sweet)	22.1	21.7	10.6	14.4	130.5	140.6	15.9	24.8	179.1	201.5
Potatoes (Solanum)	.2	.2	*	*	10.3	11.5	.3	.4	10.8	12.1
Rice	-	-	-	-	-	-	1.6	2.5	1.6	2.5
Simsim	*	*	2.8	3.8	-	-	*	*	2.8	3.8
Tobacco (Air-cured)	.5	-	-	-	1.4	1.0	*	.2	1.9	1.2
Tobacco (Fire-cured)	-	-	3.4	3.2	-	-	-	-	3.4	3.2
Tobacco (Flue-cured)	-	-	-	-	.5	.6	-	-	.5	.6
TOTALS	516.0	530.5	166.2	204.4	563.8	587.3	277.5	287.3	1,523.5	1,609.5

* Under fifty acres (All figures to nearest 100 acres)

Appendix III (e)

CROP PRODUCTION

Estimated Acreages under Crops, 1960 and 1961 - African Cultivation

NORTHERN PROVINCE

(Thousand Acres)

CROP	Lango		Acholli		West Nile/Madi		Karamoja		Total	
	1960	1961	1960	1961	1960	1961	1960	1961	1960	1961
Beans (Mixed & Cow Peas)	46.7	125.4	15.0	32.3	67.0	85.7	1.1	.4	129.8	243.8
Cassava	49.6	75.0	34.6	48.1	125.0	172.1	.2	.2	209.5	295.4
Coffee (Arabica)	-	-	-	*	.9	.3	-	-	.9	.3
Coffee (Robusta)	-	-	-	-	.2	.1	-	-	.2	.1
Cotton	157.5	196.4	119.5	145.1	75.5	99.1	2.2	2.2	355.1	442.8
Grams	.3	-	-	-	.1	*	-	-	.4	-
Groundnuts	29.4	34.9	28.4	49.9	24.8	27.0	1.6	.8	84.1	112.6
Maize	10.1	12.5	10.8	6.7	29.5	42.5	5.6	5.2	56.0	66.9
Millet (Sorghum)	108.0	152.0	34.5	63.8	14.9	18.8	105.0	80.2	262.3	314.8
Millet (Finger)	141.9 ⁺	166.1	99.3	126.6	53.3	67.0	2.0	2.3	296.6	362.0
Millet (Bulrush)	-	-	5.8	-	-	-	-	-	5.8	-
Peas (Pigeon)	141.9 ⁺	87.3	32.1	45.3	6.6	5.8	.1	-	180.6	138.4
Plantains	1.9	1.5	.6	1.0	2.9	4.1	-	-	5.4	6.6
Potatoes (Sweet)	39.9	57.3	27.6	31.6	21.1	34.7	.2	-	88.8	123.6
Rice	.2	1.5	.2	-	.7	.8	-	-	1.2	2.3
Simsim	75.9	113.2	54.2	83.4	84.6	41.3	1.8	1.3	216.4	239.2
Tobacco (Air-cured)	-	-	-	-	1.2	1.0	-	-	1.2	1.0
Tobacco (Flue-cured)	*	*	.7	.9	1.4	1.8	-	-	2.1	2.7
TOTALS	803.3	1,023.1	463.8	634.7	509.7	602.1	119.6	92.6	1,896.4	2,352.5

* Under fifty acres

(All figures corrected to nearest 100 acres)

+ Interplanted

CROP PRODUCTION
Quantities Marketed and Estimated Values (African Production): 1961
 (Values based on prices paid to growers)

Province/District	Coffee*		Seed Cotton		Tobacco:Flue-Cured (cured leaf)		Tobacco:Flue-Cured (green leaf)		Tobacco:Air-Cured (cured leaf)		Tobacco:Fire-Cured (cured leaf)		Total Value	
	Value £	Quantity Tons	Value £	Quantity Tons	Value £	Quantity Tons	Value £	Quantity Tons	Value £	Quantity Tons	Value £	Quantity Tons	1961 £	1960 £
EASTERN														
Buaga	139,238	59,098	3,431,148	-	-	-	-	-	-	-	-	-	3,570,366	3,331,180
Bugisu	972,623	5,169	300,344	-	-	-	-	-	-	-	-	-	1,272,967	1,295,089
Bukedi	-	23,558	1,354,187	-	-	-	-	-	-	-	-	-	1,354,187	1,206,622
Teso	-	20,275	1,164,531	-	-	-	-	-	-	-	-	-	1,164,531	923,564
TOTAL	1,111,861	108,100	6,250,010	-	-	-	-	-	-	-	-	-	7,361,871	6,756,255
NORTHERN														
Lango	-	24,715	1,465,660	-	582	-	-	-	-	-	-	-	1,467,222	731,601
Acholli	-	17,488	1,027,210	77	23,625	890	10,433	-	-	-	-	-	1,061,468	583,330
Karamoja	-	433	25,655	-	-	-	-	-	-	-	-	-	25,655	6,232
West Nile/Wadi	26,151	12,989	755,282	34	9,560	4,404	51,533	235	25,257	-	-	-	847,553	521,452
TOTAL	26,151	55,625	3,254,777	113	33,947	5,294	61,766	255	25,257	-	-	-	3,401,898	1,842,615
WESTERN														
Bunyoro	8,054	6,282	364,274	-	-	-	-	-	-	-	61,559	585	433,867	319,958
Tiropesi	292,419	3,782	222,270	-	-	-	-	-	-	-	-	-	514,699	533,634
Kigezi	63,554	-	-	-	-	832	6,562	-	-	-	-	-	70,116	30,568
Ankole	308,469	-	-	-	-	-	-	-	-	-	-	-	306,469	193,272
TOTAL	672,496	10,064	586,544	-	-	832	6,562	-	-	-	61,559	585	1,327,161	1,177,426
BUGANDA														
Mengo	4,137,704	36,598	2,213,625	-	-	-	-	-	-	-	-	-	6,351,329	10,195,799
Maaka	3,506,197	1,468	86,117	-	-	-	-	-	-	-	-	-	3,592,314	3,849,116
Mubende	186,462	3,098	183,550	-	-	-	-	-	-	-	4,464	45	374,476	361,050
TOTAL	7,930,363	41,154	2,483,292	-	-	-	-	-	-	-	4,464	45	10,418,119	14,406,965
PROTECTORATE TOTAL	9,740,871	214,953	12,574,623	113	33,947	6,126	68,328	255	25,257	-	66,023	630	22,509,049	24,182,261

* For details of types of production and tonnage, see Appendix IV (b).

Note: Crops included in this table are those for which quantities marketed and estimated values are known with accuracy. Crops such as maize, groundnuts, etc. of which considerable quantities are marketed are not included as reliable estimates of quantities and value are not available. All figures in this table given to the nearest ton and £.

* COFFEE PRODUCTION - 1961
Quantities Marketed and Estimated Values
(Values based on prices to growers)

Province/District	ARABICA						ROBUSTA						Total Value £
	Parcment		Rough-Hulled		Dried Cherry		Rough-Hulled		Dried Cherry		Clean		
	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Value £	
EASTERN	-	-	-	-	-	-	-	-	-	-	-	-	139,238
	5,149	953,250	-	-	315	19,373	-	-	2,590	139,238	-	-	978,683
	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	5,149	953,250	-	-	315	19,373	-	-	2,590	139,238	-	-	1,111,861
NORTHERN	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
	93	13,504	64	11,612	5	403	3	309	6	323	-	-	26,151
	93	13,504	64	11,612	5	403	3	309	6	323	-	-	26,151
WESTERN	-	-	566	102,695	165	13,289	-	-	149	8,034	-	-	8,034
	-	-	189	34,238	36	2,909	1,237	127,450	911	48,975	-	-	292,419
	-	-	92	15,558	90	72,739	21	2,155	4,035	215,407	-	-	68,554
	-	-	-	-	-	-	-	-	-	-	-	-	308,489
	-	-	347	153,591	1,103	88,937	1,258	129,615	5,586	300,353	-	-	672,496
TOTAL	-	-	847	153,591	1,103	88,937	1,258	129,615	5,586	300,353	-	-	672,496
BUGANDA	-	-	104	19,823	769	62,052	-	-	48,028	2,531,965	-	-	4,137,704
	-	-	8	1,556	586	47,268	1,682	173,328	27,736	1,440,537	12,546 [†]	1,301,536	3,506,197
	-	-	-	-	-	-	55	5,694	2,387	128,325	20,062 [†]	2,111,122	3,506,197
	-	-	-	-	-	-	-	-	-	-	58,137	58,137	186,462
	-	-	112	20,359	1,355	109,340	1,737	179,022	76,211	4,150,847	33,163	3,470,795	7,930,363
TOTAL	-	-	112	20,359	1,355	109,340	1,737	179,022	76,211	4,150,847	33,163	3,470,795	7,930,363
PROTECTORATE TOTAL	5,242	966,754	1,023	185,562	2,778	218,053	2,998	308,946	86,393	4,590,761	33,163	3,470,795	9,740,871

All figures in this table given to the nearest ton and £.

* For African and non-African estate production, see Appendix VI.

† Includes 6 tons of Arabica.

‡ Includes 380 tons of Arabica.

†† Includes 8 tons of Arabica.

OVERSEAS EXPORTS OF AGRICULTURAL PRODUCTS: 1959 - 1961

Article	Unit	Quantities				Value in £.		
		1959	1960	1961	1969	1960	1961	1961
Oilseed and Products:								
Cotton Seed	Tons	-	39	-	-	780	-	93,819
Caster Seed	Tons	2,378	1,684	1,730	106,776	90,588	-	548,801
Groundnuts	Tons	5,158	9,507	9,179	168,217	649,963	-	63,548
Sesame Seed	Tons	423	856	875	25,276	20,904	-	2,065
Sunflower Seed	Tons	262	292	67	7,899	8,271	-	1,314,639
Cotton Seed Cake	Tons	71,731	71,543	62,166	1,683,809	1,661,498	-	27,883
Cotton Seed Oil	Tons	2,770	93	197	865,373	11,569	-	6,704
Groundnut Oil	Tons	98	-	58	8,286	-	-	7,437
Other Vegetable Oils	Tons	16	-	53	1,997	560	-	98,167
Other Oilseed Cake, Meals and other	Tons	563	-	3,896	16,384	-	-	-
Vegetable Oil Residues	Tons	-	-	-	-	-	-	-
Fibres:								
Cotton, raw	Tons	55,567	58,933	62,197	15,427,910	14,930,262	-	16,716,472
Sisal	Tons	580	621	556	38,428	51,585	-	43,309
Beverage Crops and Tobacco:								
Coffee, not roasted	Tons	88,406	115,818	103,187	18,687,939	16,987,063	-	13,978,591
Tea	Tons	3,290	3,861	3,794	1,166,223	1,452,600	-	1,472,053
Unmanufactured Tobacco	Tons	14	86	20	3,787	17,710	-	4,574
Spices and Drugs:								
Chillies	Tons	143	201	338	26,780	53,846	-	81,417
Peppin	Tons	10	5	3	6,179	3,823	-	12,615
Vanilla	Tons	9	2	-	16,310	12,900	-	-
Beans and Pulses:								
Soya Beans	Tons	437	443	376	16,323	13,766	-	12,391
Others	Tons	1,322	3,336	2,744	46,123	99,308	-	76,802
Cereals:								
Maize (unmilled)	Tons	-	1,554	-	-	26,872	-	10,947
Maize meal	Tons	-	3,486	753	-	46,581	-	28
Other (unmilled)	Tons	1	8	1	83	230	-	-
Miscellaneous:								
Rubber	Tons	10	-	-	2,352	-	-	1,359
Ethyl Alcohol	Imp. Gal.	320	7,360	4,119	92	2,263	-	17,819
Sugar	Tons	1	-	829	75	-	-	-
TOTALS:								
					£ 27,591,190	36,045,166	-	84,877,183

Source: East African Customs & Excise Annual Trade Reports, 1959, 1960 and 1961.

EXPORTS OF AGRICULTURAL PRODUCE TO KENYA AND TANGANYIKA : 1961

Article	Unit	Quantities			Value in £.		
		To Kenya	To Tanganyika	Total	To Kenya	To Tanganyika	Total
Oilseeds and Products:							
Cotton Seed Cake	Tons	2,218	-	2,218	27,585	-	27,585
Other Oilseed Cakes, Meals and Other	Tons	923	20	943	21,836	560	22,396
Vegetable Oil Residues	Tons	12	-	12	111	-	111
Sesame Seed	Tons	21	813	834	1,208	37,196	38,404
Groundnuts	Tons	5,751	1,340	7,091	76,334	177,434	253,768
Cotton Seed Oil	Tons	121	76	197	13,517	6,565	20,082
Groundnut Oil	Tons	38	-	38	6,497	-	6,497
Other Vegetable Oils	Tons						
Beverage Crops and Tobacco:							
Coffee, not roasted	Tons	539	-	539	44,371	-	44,371
Tea	Tons	335	19	354	130,293	7,446	137,739
Unmanufactured Tobacco	lbs.	1,273,226	394,543	1,667,769	161,723	33,805	195,528
Cigars, Cigarettes & Manufactured Tobacco	lbs.	1,145	246	1,391	519	108	627
Spices:							
Chillies	Tons	15	2	17	2,601	170	2,771
Others	Tons	120	56	176	20,221	7,240	27,461
Fibres:							
Cotton Linters	Tons	38	13	51	3,242	1,104	4,346
Sisal	Tons	112	32	144	16,724	4,757	21,481
Cereals:							
Maize (unmilled)	Tons	1,327	8,334	9,661	21,828	138,878	160,706
Millet	Tons	462	856	1,318	8,004	21,955	29,959
Other	Tons	7	10	17	255	655	910
Pulses:							
Beans, Peas & Lentils	Tons	1,090	1,399	2,489	26,051	31,634	57,685
Miscellaneous:							
Rubber	Tons	24	-	24	4,316	-	4,316
Ethyl Alcohol	Imp. gal.	36,692	33,050	69,742	10,248	8,237	18,485
Sugar	Tons	33,001	-	33,001	1,581,078	-	1,581,078
Jaggery	Tons	22	8	30	1,018	73	1,091
Molasses	Tons	260	-	260	1,330	-	1,330
TOTALS					£ 2,864,815	479,695	3,344,511

CROP PRODUCTION, UGANDAEstate Production, 1960 and 1961

Crop	Estimated Acreage		Estimated Production		
			Quantity		Value
	1960	1961	1960	1961	1961
Coffee (Robusta)	29,543+	24,242†	Tons 4,728*	Tons 3,572*	£ 432,212
Coffee (Arabica)	2,516	2,395	380	199	47,760
Sugar	37,045	42,865	91,117	95,500	3,851,721
Tea	16,840	18,926	4,594	5,035	1,953,377
Sisal	6,000	6,000	632	518	28,000
TOTAL	91,944	94,428	-	-	7,148,576
					6,313,070

+ Bearing Acreage. Includes 4,582 on African Estates.

† Bearing Acreage. Includes 4,220 on African Estates.

* Includes 386 tons African Estate Production.

* Includes 139 tons African Estate Production.

POPULATION AND AVAILABILITY OF LAND

Province/District	Total Area Sq. Miles	Area of land excluding open water swamps and reserved forests Sq. Miles	Cultivated Area '000 Acres	Population*	Population Density Per sq. mile	Cultivated land per head of population Acres	Estimated available land per head of population Acres	Ratio of available land to cultivated land.
UGANDA								
Mengo	14,417	9,221	1,537	1,294,879	140	1.0	4.56	4.4
Masaka	7,378	3,649	406	440,180	121	0.9	5.31	5.8
Mubende	2,701	2,570	108	591,069	59	1.1	16.50	15.2
TOTAL	25,096	15,440	1,851	1,834,128	119	1.0	5.39	5.3
EASTERN								
Busoga & M'bare Township	6,940	3,133	887	660,507	211	1.3	3.04	2.3
Bukedi	1,686	1,217	429	361,318	297	1.2	2.16	1.8
Teso	1,986	1,533	511	397,650	259	1.3	2.47	1.9
	3,954	4,249	921	453,474	107	2.0	6.00	3.0
TOTAL	15,366	10,132	2,748	1,872,949	185	1.5	3.46	2.4
NORTHERN								
Acholi	10,854	10,347	474	285,530	28	1.7	23.19	1.4
Lango	5,054	4,333	782	157,833	91	2.2	7.86	3.6
Karamoja	9,230	8,094	66	174,945	21	0.6	30.13	54.0
West Nile/Madi	6,051	5,252	691	434,553	53	1.6	7.74	4.9
TOTAL	31,189	28,026	2,023	1,244,971	44	1.6	14.41	8.9
WESTERN								
Bunyoro	5,935	4,025	201	186,875	32	1.6	20.30	12.8
Tore	5,233	3,920	240	347,479	57	0.7	7.98	10.6
Asokole	5,378	559,712	503	589,712	86	1.6	6.49	6.8
Kigezi	2,039	1,689	491	493,444	292	1.0	2.19	2.2
TOTAL	19,483	15,012	1,435	1,497,510	100	1.0	6.42	6.7
PROTECTORATE TOTALS	91,134	58,610	8,057	6,449,558	94	1.2	6.81	6.4

* 1959 Census

Appendix VIII

PRINCIPAL AGRICULTURAL LEGISLATION

Subject	Ordinance No.	Legal Notice No.	Short Title	Objects
Soil Conservation	-	5	Agricultural (Amendment) Bye Laws 1960.	To increase the width of grass wash-stops in Bukedi District.
Tea	7	-	Tea Ordinance 1961	(a) To increase the representation of growers on the Tea Board. (b) To permit the cess on manufactured tea to be used to finance agricultural research on the crop. (c) To remove the cess on the licensed acreage of tea. (d) To vary the conditions of issue of tea planting licences in order to ensure that tea is planted on suitable land. (e) To ensure that tea factories are erected in suitable areas and equipped with machinery capable of producing tea of the highest quality.
Tea	-	76	Tea Rules 1961.	To specify the form of application for tea planting and manufacturing licences.
Coffee	-	75 & 211	Coffee Price Assistance (Amendment) Rules 1961.	To vary the maximum quantity of processed coffee to be exported by licensed associations of growers.
Coffee	-	98	Amendment to Schedule.	To vary the processing quotas of scheduled hulleries.

DEPARTMENT OF AGRICULTURE
STAFF POSTINGS AS AT 31ST DECEMBER, 1961

A. ADMINISTRATIVE AND
EXTENSION SERVICES

<u>TITLE</u>	<u>NAME</u>	<u>STATION</u>
Director of Agriculture	E. Williams, O.B.E.	Entebbe.
Deputy Director of Agriculture	G.W. Anderson	Entebbe.
Deputy Director of Agriculture (Crop Industries)	T.S. Jones, O.B.E.	Entebbe.
Assistant Director of Agriculture.	G.D. Badger	Entebbe.
Assistant Director of Agriculture (Field)	Major W.H. Edwards, M.C.	Kampala.
	D.J. Parsons, M.C.	Mbale.
	G.L. Kigundu, M.B.E.	Kampala.
Senior Agricultural Officers.	R.G. Hampson, D.F.C.	Fort Portal.
	H.R. Berunga, M.B.E.	Gulu.
Chief Agricultural Development Officer.	P. Evans-Jones, M.B.E.	Namalere.
Senior Agricultural Economist.	E.H. Jones	Entebbe.
Economist.	J.H. Cleave	On overseas course.
Agricultural Officers.	D.C. Todd	Fort Portal.
	J.R. Low	Jinja.
	E.W. King	Mbale
	R.B. Johnston	Seconded to St. Helena.
	A.G. Ousley-Smith	Arua.
	A.R. Dunbar	Hoima.
	W. Hadlow	Kawanda.
	A.D.R. Ker	Mbale.
	R.E.H. Atkinson	Fort Portal.
	A.R. Humphrys	On leave.
	K.M.L. Matthews	On leave.
	J.C. Phillips	Mbarara.
	J.B. Warren	Serere
	G.R.W. Onaba	Masaka
	J.S. Laker	Gulu.
	L.S. Todd	Soroti.
	S.S.M.K. Sengendo	Mubende.
	J.M. Byagagaire	Entebbe.
	L.M.A. Nyakaana	On overseas course.
	E.A. Odeke	On overseas course.
	J.M. Othieno	On overseas course.

Agricultural Engineer	D.J. Innes	Namalere.
Agricultural Officers (Uganda)	Z.H. Kwebiha	Seconded as Katikiro of Bunyoro.
	P.M. Sali	Mityana.
	S.M.N. Kijambu	Mukono.
	L.B. Ellis	Kampala.
	G.A. Fennell	Kampala.
	A.G.K. Will	Fort Portal.
	T.K. Otim, M.B.E.	Lira.
	S.M.B. Mutagwanya	Mpigi.
Senior Assistant Agricultural Officers and Assistant Agricultural Officers.	J.M. Sekimpi	Bowa.
	J.G. Wanyoto	Seconded to Bugisu A.L.G.
	R.K. Kachope	Seconded to Acholi A.L.G.
	J.B.O. Baguma	Fort Portal.
	Y.E. Onaba	Soroti.
	J.M. Luzinda	Jinja.
	H.G.N. Semambo	Kampala.
	T.F. Ellis	Kabale.
	E.B. Sarulo	Mbale.
	A.K. Mulera	Masaka.
	Z.K. Banagaija	Fort Portal.
	P.S. Bulera	Mpigi.
	I. Yigga	Mpigi.
	C.M. Kapalaga	Masaka.
	A.C. Kibulo	Jinja.
	J.N. Kimoimo	Jinja.
	S.L. Takirambudde	Mityana.
	I.M. Bulikiro	Hoima.
	H.W. Muloki, O.B.E.	Seconded as Kyabazinga of Busoga.
	Z.N. Wanyama	Mbale.
	S.B. Kikule	Masaka.
	D.E. Kawalya	Mubende.
	F.J. Luswata	U.K. on Scholarship.
	P.F. Kunya	U.K. on Scholarship.
	J.C. Ssozi	U.K. on Scholarship.
	I.L. Lubwa	Kitgum.
	N.O.Z. Sakio	Soroti.
	D.C. Collin	On leave.
	J.M. Trathen	Soroti.
	G.S.K. Byakika	U.K. on Scholarship.
	P.E.K. Sibyetekerwa	U.K. on Scholarship.
	G.W.B. Gowa	Canada on Scholarship.

Senior Assistant Agricultural
Officers and Assistant Agri-
cultural Officers (Contd.)

J.J. Oloya	U.K. on Scholarship.
W.O. Lutara	Seconded to Acholi A.L.G.
J.S. Ikara	Soroti.
P. Menya	Masaka.
F.X. Lubega	Mbarara.
A.M. Mugwanya	Mityana.
J. Obbo	Mbale.
F.X. Tebandeke	Mbale.
J. Walimbwa	Mbale.
S.L.L. Kyeyune	Mukono.
F.X. Luyombya	Mbarara.
A.S.N. Mukacha	Jinja.
E. Odhuba	Lira.
K.M.I. Popiel, M.B.E.	Kampala.
J.H. Woodruffe	Kabale.
W.A. Kneale	Hoima.
C.P.E. Wadey	Mityana
F. Bateman	Moroto.
P.W. Hay	Moyo.
M.H.F. Low	Hoima.
E.A. O'Dowd	Serere.
H.D. Paterson	On leave.
G.M. Ross	Mukono.
A.I.M. Van der Hoorn	Kasese.
J.E. Ludlow	Mukono.
M.J. Wegg-Prosser	Tororo.
H.J. McKilligan	Lira.
A. Carter	Mubende.
N. Oldacre	Kigumba.
R.S. Haineé	Mbarara
G.A. Rea	Mityana
R.D. Scott	Jinja
W.J.F. Hill	Fort Portal.
J.M. Edwards	Jinja
R.G.J. Revell	Gulu.
D.F.P. McCunnal	Gulu.
G.S. Hawkesworth	Kabale.
J. Ogwang	Gulu.
R.C. Mayindo	Kabale
M.B. Wright	Bowa.
J.P. Bulleid	Tororo
D.J. Westwood	Soroti.
D.A. Smith	Mbale
R.H. Dengate	Mbale.
M.D. Macleod	Lira.
R.G. Benson	Mbale.

Senior Field Officers and
Field Officers (Agriculture)

L. Green	Namalere.
A.J.S. Armitage	Namalere.
H.B. Miller	Gulu.
J. Tilley	Mbale.
A.L. Stephens, M.B.E.	Serere.
M.F. Merchant	Gulu.
G.K. Petrie	On leave.
D.J. Salmon	Kabale.
W.J. McClement	On leave.
P.J. Barrow	Mpigi.

Senior Marketing Officer

T. Boothroyd	Entebbe.
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Marketing Officers.

J.T. Cowie	Namalere.
N.J.P. Hewett, B.E.M.	Fort Portal.
P.J. Boustead	Mbale.
D. Sims	Kampala.

Administrative Secretary

E.B. Buckingham	Entebbe.
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B. EDUCATION.

Principals, Major Farm
Institutes.

O.S. Swainson	Bukalasa.
J.M. Arthurs	Arapai.

Agricultural Officers (Women)

Miss J.V. Willmott	Bukalasa.
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Agricultural Officers.

E.S.T. Marshall	Arapai.
G.K. Reakes-Williams	Bukalasa.
T.E.F. Weavind	Bukalasa.
G.S. Scott	Arapai
E.B. Galukande	Makerere course.

Biologists

R.C. Edworthy	Bukalasa.
T.A. Geyer	Arapai.

Senior Assistant Agricultural
Officers and Assistant Agric-
ultural Officers.

E. Kyagaba	Bukalasa.
P. Sempa	Bukalasa.
E.B. Rwakaikara	Fort Portal.
R.A. Iriglei	U.K. on Scholarship.
J.C.M. Ddunga	Arapai.
J.L. McCumiskey	On leave.
D. Adams	Mukono.
N.G. Tuck	On leave
P.W. Taylor	Ikulwe.
J.R. Dorrell	Tororo.
J.B. Littlewood	Bukalasa.
A.W.J. Todd	Bukalasa
M. Astbury	On leave.
I.L. Fisher	Bukalasa.

Senior Assistant Agricultural Officers and Assistant Agricultural Officers (Contd)	D.A. Trotman	Fort Portal.
	R.G. Bartlett	Lira.
Bursars	G.H.G. Stacey	Bukalasa.
	N.I. D'Souza	Arapai.

C. RESEARCH DIVISION.

Chief Research Officer	W.V. Rose	Entebbe.
Senior Research Officers	J. Bowden	Kawanda.
	W.R. Mills	Serere.
	D.G. Thomas	Kawanda.
Entomologists.	B.D. Rennison	Kawanda.
	W.R. Ingram	Kawanda.
	J.C. Davies	Serere.
	D.N. McNutt	Mbale.
Senior Chemist and Chemists.	D. Stephens	Kawanda.
	B. Butters	Kawanda.
	M.N. Court	Serere.
Botanists	D.J. Butt	Kawanda.
	J.W. Dancer	Kawanda.
	C.A.L. Leakey	Kawanda.
Agronomists	G.E.D. Tiley	Serere.
Scientific Officer	S.K. Mukasa	Kawanda.
Soil Survey Officer	J.F. Harrop	Kawanda.
Agricultural Officers	C.R. Horrell	Serere
	T.H. Stobbs	Kawanda.
Senior Assistant Agricultural Officers and Assistant Agricultural Officers.	A. Kanya	Bukalasa
	Y.K. Musisi	Kawanda.
	H.D. Mubiru	Kawanda.
	T.R. Odhiambo	U.K. on Scholarship.
	D.M. Patel	Kawanda.
	R.O. Wheeler	Serere.

Senior Field Officers and Field Officers (Agriculture)	K.E. Woodcock	Mbale.
	T.R. Jones	Kawanda.
	J.G. Wilson	Kawanda.
	J.R. Mayne	Kawanda.
	S.E. Mabey	Kituza.
	R.J. Cochran	Serere.
	D.E.H. Clegg	Kituza.
	W.G. Foggan	Kawanda.
Curator, Botanic Gardens.	Z.K. Katerega	Entebbe.
Executive Officer	Lt. Col. D. Macdonald	Kawanda.
Spectographer	E.W. Hughes	Kawanda.
Librarian/Abstractor	Miss C.M. Horn	Kawanda.

E. BUGISU COFFEE DEVELOPMENT SCHEME.

Field Officers	W.P. Beattie	Mbale.
	V.V. Millett	Mbale.
	F.P. Smyth	Mbale.
	R.M. Baker	Mbale.

F. KIGEZI TEA SCHEME.

Field Officer	M.J. Montgomerie	Kabale.
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G. COFFEE DEVELOPMENT SCHEME - WESTERN & NORTHERN PROVINCES.

Field Officer	C.J. Howse	Mbarara.
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